

THE PEDAGOGICAL SEMINARY

Founded and Edited by G. STANLEY HALL

VOL. XXI

DECEMBER, 1914

No. 4

MEASUREMENTS OF ABILITY TO SOLVE ARITHMETICAL PROBLEMS

By EDWARD L. THORNDIKE
Teachers College, Columbia University

Certain measurements which the coöperation of many principals and teachers in Massachusetts enabled me to make give results which seem worth reporting concerning three topics: Educational scales, Sex-differences and Retardation.

The measurements were of the success or failure of some 4,500 pupils in solving each of four problems in arithmetic, the following being the instructions issued to the principals:

INSTRUCTIONS

The experiment is a very simple one. It is to give the following work in arithmetic (without any preparation whatsoever) to any 6th, 7th, 8th or 9th grade class. A copy of the problems given below should be put upon the blackboard together with the instructions printed below. Forty minutes should be allowed for the test.

At the end of exactly 10 minutes say, "Leave example 1 even if you have not finished it. Try No. 2 now." At the end of exactly ten minutes more say, "Leave example 2 even if you have not finished it. Try No. 3 now." At the end of exactly ten minutes more say, "Leave example 3 now even if you have not finished it. Try No. 4 now." Stop all work at the end of exactly 40 minutes.

At the close of the test have each child write on the *back* of his paper—his name, the month his birthday comes in, and

his age at his last birthday. The record sheet enclosed should be filled as shown.

Send the record sheet to E. L. Thorndike, Montrose, Westchester Co., N. Y. All results will be kept absolutely confidential.

TO BE WRITTEN ON THE BLACKBOARD

Find the answers to these problems.

Do Number 1 first. Do not begin Number 2 until I tell you to do so.

If you finish Number 1 before I tell you to begin work on Number 2, look over your work to be sure that it is right.

1. A boy had 3 dollars. He paid it all for four articles, which we will call A, B, C and D. B cost as much as C. C cost as much as D. A cost as much as B, C and D together. The boy sold A and B for $1\frac{1}{2}$ times what he paid for them. He sold C and D for $1\frac{1}{4}$ times what he paid for them. How much did he get for the four articles?

2. John had \$1.20 Monday. He earned 30 cents each day on Tuesday, Wednesday, Thursday and Friday. Saturday morning he spent one-third of what he had earned in the four days. Saturday afternoon his father gave John half as much as John then had. How much did his father give John?

3. During one week Mary studied her history twenty minutes each day for six days. She studied her spelling three-fourths as long as she studied her history. She studied her arithmetic three-quarters of an hour a day, but only on two days. How many hours did she study all three together during the week?

4. A boy bought $1\frac{1}{2}$ dozen oranges at 30 cents a dozen, and paid for them with a five-dollar bill. How much change should he get?

RECORD SHEET

Arithmetic Test

1. Our city has grades in the elementary school.
(State whether 8 or 9.)
2. This record is for a class in the grade.
3. I certify that exactly 10 minutes were allowed for each problem, that no preparation or assistance was given to any pupil, and that the record below is a true statement of the success or failure of each pupil present at the test.

Record for each pupil, the first name to show sex, the month of birthday, the age in years at last birthday, and whether he got the correct answer in the case of each of the four problems. Sample records are shown in the first three lines.

Name	Birth	Age	Problems			
			1	2	3	4
Mary.....	June	12	W	W	R	R
Jane.....	Sept.	15	W	W	W	R
Helen.....	Nov.	11	W	R	R	R
Etc., etc.						

EDUCATIONAL SCALES

We very much need a series of sets of arithmetical problems, each set containing problems of equal difficulty, and the series of sets forming a gradation, by short steps of difference, from very easy to very hard problems. It is often desirable to measure the achievement of an individual or a class or a school by how hard a problem can be solved in a given time rather than by a 'blanket' score for the amount done of an ordinary examination task, combined somehow with its quality.

The most useful present definition of increase in 'difficulty' of arithmetical problems for a given group of pupils is that increase whereby the percentage of pupils solving the problem decreases; and any statement of a problem's difficulty in terms of the percentage of pupils of a known age or grade solving it within a defined time (here 10 minutes) is a step toward such a graded series or scale as was mentioned above. We can, for example, use Problem 3 of the above list more intelligently, once we have found that it is such a problem as half of the pupils in grade 7 (in November) solve (with correct answer) in 10 minutes or less. So also to know that Problem 4 of the above list is solved (with correct answer) by three-quarters of pupils in grade 6 (in November, and in systems having 8 grades in the elementary school) is a useful fact and will be tenfold more useful when other similar facts are obtained and used in connection with it.

Such facts for the four problems of our list, the tests being of date Nov. 15-25, are:

PERCENTAGE OF CORRECT SOLUTIONS IN 10 MINUTES

Systems with 8 grades				
	Problem 1	Problem 2	Problem 3	Problem 4
Grade 8.....	30.6	37.6	65.5	94.4
Grade 7.....	18.1	22.3	48.9	87.0
Grade 6.....	6.7	17.3	26.5	76.6
Systems with 9 grades				
	Problem 1	Problem 2	Problem 3	Problem 4
Grade 9.....	41.1	60.2	83.1	96.8
Grade 8.....	25.6	44.3	71.8	95.5
Grade 7.....	13.2	22.1	55.2	93.9

By making any allowable hypothesis about the form of distribution of ability at problem-solving in each of these grades, we can express the differences in difficulty between 1 and 2, and 2 and 3, and 3 and 4 in commensurate terms. By making any allowable hypothesis concerning the difference between the difficulty of Problem 4 and zero, or 'just not any,' difficulty, we can express the difficulty of each of the problems by a simple cardinal number representing its amount of that thing, '*difficulty*,' wherein these problems differ so that fewer pupils solve 3 than 4, 2 than 3, and 1 than 2.

For example, suppose that we assume that a 7th or 8th 'grade' in these schools represents a selection of children clustering around the average ability for that grade symmetrically in approximately the manner described by the probability curve, and call "*Q dif*" that amount of increase in difficulty which would reduce the percentage of correct solutions (in 10 minutes) from 50 to 25, in a 7th or 8th grade.

Then for grades 7 and 8 in 8-grade systems, and 8 and 9 in 9-grade systems, Problem 2 is a little over 1*Q dif* harder than Problem 3, and Problem 1 is about $\frac{1}{2}$ *Q dif* harder than Problem 2. Problem 4 is about $1\frac{2}{3}$ *Q dif* easier than Problem 3. If we assume further that Problem 4 is somewhat over three times as far *above* zero difficulty as it is *below* the difficulty of Problem 3, we have:

The difficulty of Problem 4	=	$5\frac{1}{3}$	<i>Q dif.</i>	approximately.
"	"	3	=	7 <i>Q</i> " "
"	"	2	=	8 <i>Q</i> " "
"	"	1	=	$8\frac{1}{2}$ <i>Q</i> " "

These results are frankly hypothetical, being given only to illustrate the method.

SEX DIFFERENCES IN PROBLEM SOLVING

Using the results of the tests described on page 496, I have measured the superiority of boys to girls of the same school grade in solving arithmetical problems. It would be sounder to compare boys with girls of the same age, using either a complete or a random selection, but the constant errors introduced by comparing those of the same grade are slight and in any case can be studied and allowed for later. They are probably such as on the whole favor the boys a trifle.

I report the facts in Table 1, and similar facts for some 1,300 children in grades 7, 8 and 9 in cities having nine-grade systems in Table 2. For those unacquainted with the significance of the quantities described as "Estimated percentages of boys reaching or exceeding the median for girls of the same

grade," Figure 1 shows graphically the amount of difference when the quantity in question is 60 per cent.

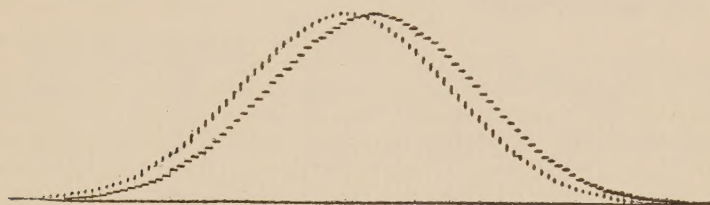


FIG. 1.—Sixty per cent. of the surface of frequency enclosed by the horizontal dash line curve reaches or exceeds the median of the surface of frequency enclosed by the vertical dash line curve.

TABLE 1

The Achievements of Boys in Solving Arithmetical Problems Compared with those of Girls of the Same Grade: in Cities with Eight Grades in the Elementary School.

		In Grade 8	In Grade 7	In Grade 6
Number of boys tested.....		641	452	423
“ “ girls “		850	537	415
Percentage of boys solving No. 1..		36.2	20.6	8.7
“ “ girls “ “ ..		26.9	14.2	4.1
“ “ boys “ No. 2..		42.4	23.7	16.5
“ “ girls “ “ ..		34.5	19.0	14.5
“ “ boys “ No. 3..		73.0	49.3	30.0
“ “ girls “ “ ..		59.9	41.5	20.5
“ “ boys “ No. 4..		96.4	90.0	82.7
“ “ girls “ “ ..		94.6	82.9	72.2
Estimated percent-	as per No. 1	60	60	65
ages of boys reach-	“ No. 2	58	56	53
ing or exceeding the	“ No. 3	69	58	62
median achieve-	“ No. 4	58	63	64
ment of girls of the				
same grade.				

The total average estimate is that 61% of boys reach or exceed the median achievement of girls of the same school grade.

TABLE 2

The Achievements of Boys in Solving Arithmetical Problems Compared with those of Girls of the Same Grade: in Cities with Nine Grades in the Elementary School.

	In Grade 9	In Grade 8	In Grade 7
Number of boys tested.....	174	267	224
“ “ girls “	183	242	228
Percentage of boys solving No. 1..	57.5	31.5	17.4
“ “ girls “ “ ..	44.8	21.9	11.4
“ “ boys “ No. 2..	67.2	51.7	24.1
“ “ girls “ “ ..	55.7	40.1	24.1
“ “ boys “ No. 3..	96.0	79.4	63.4
“ “ girls “ “ ..	86.3	78.5	60.1
“ “ boys “ No. 4..	98.85	98.5	97.3
“ “ girls “ “ ..	98.4	97.9	97.8
Estimated percent- ages of boys reach- ing or exceeding the median achieve- ment of girls of the same grade.	as per No. 1 62	61.5	60.5
	“ No. 2 62	61.5	50
	“ No. 3 74	51	53
	“ No. 4 59	57	47

The total average estimate is that 58% of boys reach or exceed the median achievement of girls of the same school grade.

The general result—that 60 per cent of the boys reach or exceed the median for girls—is much the same as Thompson found in comparing men and women in respect to a similar test. I have also computed the sex differences in the number of problems solved correctly in the Courtis test with problems (No. 6) from the data recently published by Courtis.¹ The results are as follows: In Grade 7B, in which the difference is greatest, about 67 per cent of boys reach or exceed the median for girls. In Grades 6A, 6B, 7A, 8A and 8B the difference is less. The detailed scores are not given by Courtis, but if they were, the general result for these grades would be apparently very close to the 60% obtained in the present study. It should be added that in high-school pupils Courtis finds a much smaller difference.

The sex difference found is small in comparison with individual differences within either sex, but in comparison with the differences between one grade and the next it is consider-

¹ Interim Report: Committee on School Inquiry: Board of Estimate and Apportionment. Report on the Courtis Tests in Arithmetic, pp. 137 and 138.

able; for these also are small. Roughly the boys are about half as far ahead of the girls in the same grade as they are of the boys in the preceding grade.

RETARDATION

In the discussions of the past five years concerning 'retardation'—i. e., the presence of children in grades below those where they would be had they entered grade I at six or seven and progressed one grade a year—it has often been assumed that many such pupils are held back in spite of ability to do the work of a more advanced grade as well as, or better than, the younger pupils in that advanced grade.

The contrary is probably the case, teachers and principals tending to promote the older of a group of pupils of equal ability and achievement more freely than the younger ones. This conclusion appeared probable to me years ago from the fact that in psychological tests of ability the young pupils ranked higher than the old in the same grade. It has recently been confirmed by measurements of educational achievements proper, and I shall present one sample of such studies at this time.

The educational achievement measured in this sample study was the ability to solve the four arithmetical problems of page 496, ten minutes time being allowed for each, the directions being as stated on page 495.

There was no reason for any departure from these directions, but such would not in any case act to invalidate any of the conclusions which will be drawn here. For such would not favor old more or less than young children.

If, now, we compare the achievements of young and old children in the same grade, say 11-year-olds and 16-year-olds in grade 8 of cities with eight grades in the elementary school, we find at once that in general the older the group of children is, the less well the group ranks. Thus 38.5% of these 11-year-olds solved problem 1, while only 20% of these 16-year-olds did; 52% of the 11-year-olds solved No. 2, while only 26.7% of the 16-year-olds did; 69.2% of the 11-year-olds solved No. 3 while only 56.7% of the 16-year-olds did.

I present the relevant facts in Tables 3, 4 and 5. These tables give, for each age in each grade, (1) the number of children tested, and (2) the percentage obtaining correct answers to each problem.²

These tables should be consulted for any exact estimate of the differences in question. As a rough means of seeing

² Problem 4 was used only in the case of Grade 6, since it is solved correctly in ten minutes by practically all the children in grades 7 and 8.

their approximate total drift at a glance, I have averaged the "Percentages correct" for the 9-year-olds in grade 6, the 10-year-olds in grade 7 and the 11-year-olds in grade 8; those for the 10-year-olds in grade 6, the 11-year-olds in grade 7 and the 12-year-olds in grade 7; and so on throughout. Comparing the younger and older pupils with those of medium age (the middle two years for each grade) we have, as average percentages correct:

Youngest	Next Youngest	Two middle Years	Next Oldest	Oldest
38.7	36.2	33.1	32.4	30.7

I venture to prophesy that in the 'intellectual' school subjects, such as reading, arithmetic, geography, language and history, superiority of the younger to the older pupils in the same grade will be found to be the rule. In handwriting and drawing, where age counts more, the reverse may be true. If retardation meant being held back to do less advanced work than the pupil really could do, it would be the case that the youngest pupils in any given grade would on the average be the most retarded. The prime fact is that individual differences amongst children of the same age enormously outweigh differences between the average for any one year and the average for the succeeding year.

TABLE 3

The Achievements of Children 11, 12, 13, 14, 15, and 16 Years Old in Grade 8

	11-year olds	12-year olds	13-year olds	14-year olds	15-year olds	16-year olds
Number of children tested.....	52	432	543	323	106	30
Percentage solving problem 1.....	38.5	31.3	32.0	27.6	34.0	20.0
Percentage solving problem 2.....	52.0	36.8	38.1	35.9	43.4	26.7
Percentage solving problem 3.....	69.2	69.9	65.0	62.5	60.4	56.7

TABLE 4

The Achievements of Children 10, 11, 12, 13, 14, and 15 Years Old in Grade 7

	10-year olds	11-year olds	12-year olds	13-year olds	14-year olds	15-year olds
Number of children tested.....	22	234	408	177	116	26
Percentage solving problem 1.....	22.7	21.8	19.1	9.6	11.2	19.2
Percentage solving problem 2.....	31.8	24.8	22.5	15.8	15.5	23.1
Percentage solving problem 3.....	40.9	57.3	47.5	32.8	35.3	38.5

TABLE 5
The Achievements of Children 9, 10, 11, 12, 13, and 14 Years Old
in Grade 6

	9-year olds	10-year olds	11-year olds	12-year olds	13-year olds	14-year olds
Number of children tested.....	18	214	299	181	92	33
Percentage solving problem 1.....	10.5	6.1	7.7	7.2	3.3	0.0
Percentage solving problem 2.....	26.3	15.0	17.4	14.4	10.9	15.2
Percentage solving problem 3.....	36.8	23.8	28.1	22.1	26.1	18.2
Percentage solving problem 4.....	57.9	75.2	76.3	80.7	83.7	78.8

A STUDY OF FALSEHOOD

By HARRIS L. LATHAM, Presbyterian Training School, Chicago, Ill.

Him thus intent Ithuriel with his spear
Touched lightly; for no falsehood can endure
Touch of celestial temper.—*Milton.*

We have various modes of presenting our discoveries; we may use poetry, narrative, scientific essay, philosophic essay, the pictorial arts and the drama. By each of these instrumentalities men have given us information on falsehood. No one of these means can be safely discarded, yet the scientist and the philosopher will be the judges in the court of final appeal.

In the work of serious analysis falsehood and truth are concepts that very readily suggest a logical treatment of the problem. Consequently in the works of the logicians will be found elaborate discussions of fallacies; Aristotle set the problems. Well-known writers on falsehood and truth include such names as Sedgwick, W. W. Johnson, J. W. Powell, C. M. Wieland, J. Watson, F. C. S. Schiller, John Fiske, J. Cook, Saint George Mivart and all of the writers of standard texts in logic.

The broader reaches of philosophy inevitably lead into the problem of falsehood. A capital instance of this is the doctrine of Maya or illusion so welcome to the philosophic mind of the East Indian. All of the phenomenal world is false; reality can be known only in nescience, on the sense plane; a universal knowledge which grasps the illusory nature of all that is not soul discovers reality in the identity of the soul with the Brahman.

In art the problem of falsehood is well recognized. Paulhan for example has discussed "*Le Mensonge de l'Art*" through three hundred and seventy-seven pages.

In a larger way falsehood as a constituent trait of human character and personality is treated in Paulhan's "*Le Mensonge du Caractère*;" his principal topics are false indifference and simulation.

The most revolutionary treatise at hand is by Max Nordau; he has written on the Conventional Deceptions of our Civilization. The German original appeared in 1883; translations into

a number of the European languages have been made. On its appearance friends and foes quickly arose to share in a violent discussion. The author found himself surrounded on every side by deception and hypocrisy. We all play a part in a profoundly immoral comedy due to an almost unmitigated egoism, precipitated by the struggle for existence.

In more recent decades the psychological approach¹ to the study of falsehood has been preferred. Some of the topics already treated may be enumerated: the lie, children's lies, the lie of pathological cases, our general attitude toward truth, popular delusions, conjuring deceptions, falsity in report, make believe, illusions, the social uses of deception, the relation of imagination and falsehood.²

¹ The subject of falsehood is indeed a matter of prime interest in view of the following: "Perhaps the most interesting contemporary group of thinkers in the psychic field is now challenging consciousness itself, which has so long been the oracle of philosophy, as never saying what it means, but always dealing with symbols that need laborious interpretations, the canons of which they are now attempting to evolve." G. Stanley Hall, "Educational Problems," Vol. I, p. 348.

² The exact titles of some of the numerous articles and books dealing with these topics are herewith transcribed: Felix-Thomas, "Le Mensonge," *Revue Pédagogique*, Vol. 50, pp. 509-19. Drommard, "Les Mensonge de la Vie Interieure." St. John, "A Genetic Study of Veracity," *Pedagogical Seminary*, Vol. XV, pp. 246-70. G. Stanley Hall, "Children's Lies," in his "Educational Problems," ch. VI (and *Ped. Sem.*, Vol. I, pp. 211-18). Lipmann, "Einige interessante Kinderluegen," *Zeitschrift fuer paedagogische Psychologie, Pathologie und Hygiene*, Vol. 8, pp. 85-88. In the same journal, Vol. 7, pp. 195-201, see also Schafer, "Kommen Luegen bei Kindern vor dem vierten Jahren vor?" Guillermet, "Un cas de mensonge infantile," *Archives de Psychologie*, Vol. 2, p. 377. Demoor et Daniel, "Les enfants anormaux à Bruxelles," *Année Psychologique*, Vol. 7, pp. 286-313. "Rapport oral sur les mensonges d'enfants," *Bulletin de la Société Libre pour l'Etude Psychologique de l'Enfant*, 1902, pp. 130-137. Oppenheim, "Why Children Lie," *Popular Science Monthly*, Vol. 44, pp. 382-87. Barnes, "Why Children Lie," *Current Literature*, Vol. 34, pp. 213-14. Richard, "Le mensonge chez la femme hystérique." Delbrueck, "Die pathologische Luege und die psychisch abnormen Schwindler." Piper, "Die pathologische Luege," *Zeitschrift fuer paedagogische Psychologie, Pathologie und Hygiene*, Vol. 8, pp. 1-15. Jonckhiere, "Le Mensonge chez les Arriérés," *Archives de Psychologie*, Vol. 2, pp. 263-66. Eisenhofer, vide "Wahrheitsgefühl" und "Wahrheitsliebe" in Rein's *Encyklopaedische Handbuch der Paedagogie*, Vol. 7, pp. 538-44. Chas. Mackay, "Memories of Popular Delusions." Jastrow, "Fact and Fable in Psychology." Triplett, "The Psychology of Conjuring Deceptions," *American Journal of Psychology*, Vol. II, pp. 439-510. The Aussage literature, as Stern's "Erinnerung, Aussage und Luege in der Ersten Kindheit" (abstract in *American Journal of Psychology*, Vol. XXI, pp. 270-82); Lobsien, "Aussage und Wirklichkeit bei Schulkindern," *Beiträge zur Psychologie der Aussage*, Vol. I, Heft 2, pp. 26-89. "Original Make-Believe Games," *Pedagogical Seminary*, Vol. VI, p. 317 ff.

As an example of a monographic treatment from the psychological point of view we may refer to Duprat's "*Le Mensonge, Etude de Psycho-Sociologie Pathologique et Normal*" (1909). The ground covered includes the description and classification of deception, deception in abnormal persons (criminals included) deception in children, deception in social life, deception in primitive and cultured societies, the psychophysiology of deception, the moral aspects of deception, deception and education.

This study was made on material gained by a questionnaire sent to school teachers to ascertain the facts as to voluntary and involuntary modifications of truth by school children. It is sane, balanced, illuminative and suggestive of further studies of a similar character.

The present writer proposes a study of falsehood from a viewpoint different from all those alluded to above. A vocabulary as nearly exhaustive as possible was collected.³ This list of words contains the terminology, current in the English-speaking world of to-day, used to describe or denote every false relation, fact, act, idea, etc., with which we have to deal. The entries number nearly twenty-five hundred.

For facility of treatment it seems best to allow the material to fall into two groups: terms that denote general concepts; terms that represent special concepts. This distinction is not absolute, but nevertheless is sufficiently correct for our present purpose. The specialized types of action are denoted by such terms as thievery, cheating at games, treason, magic, lying, stratagem and the like; the present paper will not treat of these further.

The general terms are concerned with states of mind, consequences of acts, attributes of persons, acts and so on. These words are almost wholly indicative of an intellectual state in which falsity plays a part. They serve to describe the reaction of the individual mind to experiences in which falsity is a vital factor.

One indeed soon discovers while making this study that the facts are nearly all social facts. By far the larger part of the actions described are not performed by the agent on

³ Suggestions on the use of vocabularies may be drawn from the following: Westermarck, "The Origin and Development of Moral Ideas," Vol. I, ch. VI. Bréal, "Semantic." Articles in the Pedagogical Seminary: M. C. and H. Gale, "Vocabularies of Three Children," Vol. IX, pp. 4, 22-35. Chambers, "How Words Get Meaning," Vol. IX, pp. 30-50; Trettien, "Psychology of the Language Interest of Children," Vol. XI, pp. 113-77 (with bibliog.); Doran, "A Study of Vocabularies," Vol. XIV, pp. 401-38; Mateer, "The Vocabulary of a Four-Year-Old Child," Vol. XV, pp. 63-74.

himself but upon another person or group of persons. And yet there is a range of mental states in which precision and definiteness to a degree are wanting, where classification of the facts has remained in general terms rather than advanced to specific ones.

To facilitate discussion the following rubrics have been selected: the act (neuter, subjective, objective); attributes of the act; the concept; attributes of the concept; the person (agent, patient); the attribute of the person. Other classifications of the data might have served the purpose as well, but the suggestion of this one came naturally out of the material and represents very largely the human interests involved in the experiences described.

It is convenient to distinguish acts which are directed essentially toward an effect to be produced in another living being from those that have a subjective goal in the person of the actor himself; both of these classes may be oftentimes demarcated from a third which embraces acts that are equivocal, acts in which the person or thing that experiences the consequences of the acts is not determined. Our ordinary grammatical distinctions of transitive and intransitive are not adequate guides at this point because these distinctions are formal and do not permit the elasticity desired. For the purpose of this discussion all actions that have no specific indication of their goal whether self or other living being may be termed neuter. This class will be vigorously reduced to the minimum for the sake of economy; for it facilitates apprehension of experience to regard it from the viewpoint of its most concrete aspects rather than from its more generalized and therefore more elusive relations. Our first task then is a study of states, processes, relations expressed by terms denoting action, but not indicating specifically any person or thing as appreciably affected by the act. We postpone a discussion of the verbal falsehood as constituting a special sort of falsity.

An obsolete use of the verb *to false* as a transitive verb has the meaning to falsify, to make untrue, to introduce falsehood into something. It also means to maintain to be false. *To falsify* means to make false or incorrect, to alter fraudulently, to introduce false matter into or to give an incorrect version (of a document, etc.), to alter or pervert from the correct rule, to declare or prove false; as v. i. to make a false representation; to deal in falsehood (Obs). As a metaphor taken from a mechanical process we use *distort* as a synonym.

There is a small group of words formed with the prefix *mis-* that must be considered here. *Misapplication* (*to mis-*

apply) is forming wrong associations for a given truth, doctrine, or principle, attempting to place the wrong particular under a given principle or rule; this is an intellectual error in the use of a general fact or truth. Another case is a *mistake* in the selection of an object or matter; here one *mischooses* the thing selected, doubtless out of a wrong estimate of values. Not unlike this is the error of placing a given object in the wrong class or category, that is, *misclassification*.

Mathematical error is fairly considered as colorless for the most part as the notions just alluded to. One may *miscipher*, *miscalculate* or *miscompute*. The *miscomputation* may be affirmed without designating the direction of the consequences of the error in mathematical processes. The unique significance of the term is that it points out the fact of error in some mathematical operation and by a metaphor gives some estimate of forces in operation within the range of the observer's attention.

If the person under consideration suffers error in the matter of his volitional activities he may be said to have *misintended* when his act of will turns out to be ill-advised. The act is called a *misintention*. A *misstep* is an error in procedure; it may refer to an accident while out walking or to an erroneous decision. To *simulate* (*simulation*), (*mis-seeming*, Obs) connotes false assumption, feigning, pretending, suggesting falsely; or to convert into something by simulation (Obs); or to put forward deceptively (Obs. Rare); as v. i. to pretend or to feign.

Here belongs a section of the terms that denote logical error. The greater part of the general vocabulary of falsehood may be used in describing illogical procedure, but a specific list of terms has been developed. To *chicane*, to *cavil*, to *false*, to *gerrymander*, to *paralogize* (*paralogism*), to *misinfer*, (*misinference*), to *misjudge*, (*misjudgment*), to *quibble* (a *quibble*) all indicate the type of error now before us. The mildest of these terms is the *misinference*: with one or more premises given a wrong inference is drawn. Logically antecedent to the *misinference* is the *misjudgment*, which of course necessitates error in all processes founded upon it. To *paralogize* is to argue falsely; it is a highly technical term and is almost a pedantic name of a very simple fact. The *paralogism* is a piece of illogical reasoning, an erroneous argument, a fallacy; all of these terms are strong in that they brand the argument described in its true character.

Illegitimate logic is as often defensive as it is offensive. To *cavil* is to raise captious objections or to find fault without

reason; to chicane is to quibble over a matter and a quibble is an equivocation of the point at issue, an evasion of the real point in the argument.

A very peculiar characterization of falsity in argument grew up from the conduct of Governor Elbridge Gerry of Connecticut, in regard to the redistribution of electoral districts for the purpose of favoring his political party. To gerrymander has since come to signify to garble and misconstrue, as the premises of an argument, so as to arrive at a forced conclusion.

A critic may witness some false act or discover a false situation; to error in such a case is to decide a thing to be erroneous (chiefly in law).

We may summarize the mental acts thus far enumerated as follows: to make untrue, to introduce falsehood into a true somewhat (document, procedure, etc.); to attempt to govern a given act or piece of procedure by unsuitable law or principle; to err in the selection of a part from a whole; to err by wrongly classifying a thing; to commit mathematical errors; to misjudge the course of events; to make a wrong decision; to mistake the proper steps in a procedure whether in bodily action or abstract projects; to attempt to duplicate qualities found in other persons; to commit a logical fallacy, to misconstrue purposely points at issue in an argument for the purpose of evasion, or to force a biased conclusion; to pronounce erroneous after examining an object.

These are fair instances of judgments in which the least possible implication appears as to an estimate of the actor or the least possible evidence of the outcome of the act upon any one within its reach. These highly refined judgments show man changing the true into the false, intermingling the true and the false, thinking false thoughts, adopting false procedure, making false decisions, recognizing false entities as true.

These descriptions differ from those yet to be presented under our heading "concept" only in this particular—these are unequivocally discriminated as actions of a person.

We now advance to a group of discriminations in which the trend of the act is directed toward a particular subject (person). The outcome of the act is reflexive, internal, subjective. Whatever consequences of the act may reach out into social groups they exist positively without presenting a clue so far as the analysis of the situation is concerned. Falsehood, error and all the allied factors then may be experienced by a single person without the active cooperation

of other persons. Moreover these experiences may consist of overt acts as well as of passive states.

One's ideas, policies, theories, plans, opinions and the like may be projected into wrong directions; may embrace more or less of untruth. In such cases the person *aberrs*, *errs*, *mis-thinks*, *goes astray*, *wanders into error*. It is a case of *aberrance* (*aberrancy*, Obs), or *straying into a vagary*, a case of *aberration* or *deviation* from a direct, prescribed course of action whether intellectual or moral. Aberration even in a normal person may readily suggest a pathological tendency. One errs by adopting a false principle; he *blunders* in wrongly applying a principle.

The more emphatic instrumentality of the self in the committing of mistakes is seen when one *deceives* or *fools himself* (*self-deceit* or *self-deception*) or perchance *allows himself to be misled*. The result of all this is a *delusion* in the sense of being misled (Obs). One may be led to *believe what is false*. Two slang expressions have the same import: *to get bit* and *to get the sack*, signifying a state of deception in which one has been a contributing factor.

One often starts out well in a course of thinking and ultimately *overshoots the mark*, thus *falling into error*, *getting into the mists*, *being drawn into error* or *lying under an error*. A milder situation may arise perhaps when we merely *misappreciate* the conditions of things. This *misappreciation* depends on a *misapprehension* of the facts as presented. One *misapprehends* when he does not rightly observe, when he gains erroneous information by failure in the simplest act of recognition of a fact. If the error is more serious he may *miscomprehend* or *misunderstand* the whole situation. If narrowly intellectual it is a case of *misconception*; one may *misconceive* that which is to be realized in some future action or event. (*Misconceit*, n. and v. more rarely.) A *misinterpretation* of factors in a situation will result in a *misconjecture* as to the outcome of the acts, or series of events. Very often statements heard or facts presented may be in themselves true and correct but out of ignorance or for some other reason they are *misconstrued* and their proper import *misinterpreted*. This *misconstruction* is also described as due to *misdistinguishing* or *misknowing* the facts; more commonly we *mistake* them, through insufficient observation. We may misconstrue that from which the meaning is gathered by inference; we *misinterpret* that which is intended to express a given meaning.

If the problem relates to matter confessedly darkly understood one may despite all be constrained to attempt to *decipher*

it. In this case he is apt to *misguess* the facts or to *mis-imagine* the elements left for conjecture. In this connection we often resort to mathematical attitudes of mind; wherever failure attends our efforts we may be guilty of *miscalculation*. If we *miscalculate* we also *misreckon* or *reckon without our host* by overlooking some determining element in the circumstance.

Typical and well recognized psychological processes are involved in these erroneous adventures of the mind. *Mis-recollection* (to *misrecollect*) is due largely to a mislearning and in turn constitutes a part of *misremembering* or *mis-imagining* in the case of an attempt at an imaginary construction. If we misjudge matters presented to us we are said to misdeem them (Obs.).

If we ever misstate the facts it is, alas, because sometimes we *mismean* the proposition that we utter. If we are unduly credulous it is because we *misbelieve* (*misbelief*). If we hold to false opinions we are guilty of *pseudodoxy*.

Hallucination is a pathological experience in which whether a sense stimulus be present or not the patient falsely supposes he perceives objects. In the *illusion* the normal person likewise commits error in perception, but it is due to a complication of natural processes, with no disease factor present. Our interest is in the fact that both of these psychical states are well known to involve unequivocal error; this error is positively subjective in its origin, the external factors are so allocated as to furnish the appropriate stimulus.

We conclude then that a person may precipitate himself into intellectual error by allowing himself to be deceived, to err, by actually embracing error, by carrying a correct principle or policy too far, by using insufficient insight in the apprehension of facts, by remembering poorly, by intentionally perverting the facts, by wrongly perceiving objective things, or by being over credulous as to matters reported.

Our next division deals with these more narrowly intellectual processes as they reach out beyond the actor to a part of his social environment. We have considered actions that are largely colorless as to their outcome, actions that positively react on the actor; now we examine the processes that expressly modify conditions in a living being other than the actor. It is not to be assumed that any of these acts are necessarily consciously apprehended as to the element of falsity; the awareness of the presence of falsity must be affirmed only on the warrant of positive information to that effect. That is, an act may be false and work out its effect on society without being recognized as false by the perpe-

trator of the deed. This matter of cognizing the false factor may be determined only by the full context of the situation; this situation may be or may not be summed up in the term that describes the act in its aspect of falsity.

Even in case the falsity of the act is known to the actor the degree of this apprehension is a constantly varying factor and cannot be considered for the most part in a discussion like the present. Our concern is strictly with the fact that one person performs an act that modifies typically the state of mind of another person or group of persons, animal or group or animals, in such a manner as to introduce into this state of mind some element of error or falsity. The factor thus introduced is specifically intellectual and is therefore general in character.

Mystification is an act in which one plays upon the credulity of his victim, *throws dust in his eyes*, and so prevents him from exercising his ordinary intelligence. A state of *bewilderment* arises when one is *bamblustercated*, *hoodwinked*, *inveigled* (Obs), *mystified* and he is in a state in which he can easily be *humbugged*; he is in a *haze*; he is *mixed*; he is *blind*.

A more complex means of deception is that of *charming* a person. Here the actor *fascinates*, *bewitches*, *enchants* his victim so that he cannot exercise his normal intelligence. His capacity for usual precaution is disabled. *To feed* implies something of helplessness on the part of the victim, as he is easily deluded into the acceptance of fictitious facts. In order to describe more vividly this type of deception another metaphor is allowable, that is, to *fox*, meaning to compass and end by some crafty means. *To get it over* one is to seduce him, to fascinate him and so accomplish some nefarious design.

Deceit, to *deceive* (to *feint*, Obs), *deception* all are terms designating an action in which one conceals the truth from another in order to mislead him, causing him to believe what is false. To *hallucinate* formerly had the same meaning. A *heave* is a mere attempt at deception.

The situation is more serious when the actor *deludes* (*eludes*, Obs., *foxes*, Obs.) his victim, leading him by pretense to hold a false opinion; this act of *delusion* consists in *befooling* a person in his expectations. It is the same as to *dupe* or to *fool* or to *make a fool* of a person. It involves *pretension* (to *pretend*), that is, alleging falsely with the intent to deceive.

A very moderate form of deception consists of *simulation*: *falsely suggesting*, *putting forward deceptively* (Obs.) with the intent to deceive. A positive action takes place when one *misinforms* the one duped on some point of fact; if this is an extended process it becomes *misinstruction* (to *misinstruct*)

and both necessarily involve *misrepresentation* (to *misrepresent*) or *false representation* of facts.

A more aggressive though perhaps less effective deception results from an attempt to *bluff* a person. The plan here is to *blindfold*, to *hoodwink* a victim so as to deter him from an act by a false show of opposition with a view to the achievement of some hidden purpose. Usually the actor expects some definite personal gain; he may *run a bluff* with a pretense of assurance covering real uncertainty or weakness on his part. A metaphor drawn from the kitchen is to *sweeten*, approximately denoting the same as to *stuff*. A slang expression appears in to make one *believe that the moon is made of green cheese*.

The significant difference between these other acts and *guilery* is that the latter marks out the deception as arising in the wicked nature of the actor, due to a wily regard for his own interests. To *guile* is to beguile or to deceive. Success in capturing game has yielded a term descriptive of this same act: to *gull* is to capture a person by means of a trick, to make a gull or dupe of one. A *gull* is a trick or piece of deception; *gullage* and *gullery* are alternatives of the same import.

When special pains are taken to use soft phrases or sophism the deceiver *hones* his victim. If the arts of the *juggler* are at command one can *sleight* the duped one, using craft and cunning in a piece of subtle dealing, thus producing an *illusion* in the observer's mind. A *wile* is an act of deception in which cunning artifice is employed. By so doing the deceiver *sucks* the deceived, *takes him in* and perhaps at once proceeds to greater crimes.

In an attitude of defense one may *baffle* his pursuers whether he is in physical flight or is meeting logical attacks; if a known fact when expressed is likely to harm one he may resort to *reservation* on being questioned and so deceive; he may mislead an opponent by giving him a *false scent*. A reservation is a deceptive answer or excuse (Obs. as to excuse). A similar *evasion* is to *shuffle*, making use of false pretenses or unfair *shifts*, to *conceal* the facts, to *fence*, to perpetrate a *come-off*, or to give one the *go-by*.

In brief then to deceive another is so to affect his mind as to prevent normal action of the powers of understanding, to induce an overestimate of specific values or factors, to lead into misunderstanding by means of a cunning trick, to suppress truth, to disappoint expectations, to suggest false ideas, to arouse self-regarding feelings in the victim and so render clear comprehension impossible.

We have found that false acts have been marked and named in unmistakable terms applicable to them alone. But not satisfied with this English speaking peoples have attempted to describe the falsity of conduct by designating the qualities exhibited in these acts. Substantive and adjectival expression largely cognate in etymology with the words naming actions are used to express these qualities.

While the essential significance of the judgments next to be studied may not be oftentimes appreciably different from the denotation of the action names, it will be worth while to observe what aspects of these false actions have so impressed the mind as to secure special recognition.

The development of attributive notions has permitted the marking of a false quality appearing in a slight degree in an act characterized mainly perhaps by some other quality. Action names are usually not indicative of the degree of qualities comprising an act; whereas by means of the substantive and the adjective an act obviously true in its main aspects may be described in its secondary attributes and so its falsity be accurately labelled.

Actions may be described as merely consisting of *wandering* from truth; in this case motives are not under observation and the drift of the process is impliedly poorly understood by the actor. He is preoccupied perhaps with other matters. If so the act exhibits *aberration*, an unaccountable deviation from uniform law or procedure. The act is *erroneous*, the thought, opinion, conclusion is *erroneous*, *errorful* in so far as it is recognized by the critic as falling short of the standard employed.

Wide of the truth is another phrase expressing the same judgment, the definite consciousness of a point of divergence from the norm of the comparison; it is somewhat more emphatic than the term *untruthfulness*, though the latter is a far more scathing epithet. *Inaccuracy* suggests divergence from a known standard in some procedure, but it will describe mental acts as well.

From another point of view acts are seen to exhibit *falseness*. (Falsity, falsimony.) This connotes the antithesis to truthfulness without implying a genetic relation to it. *Aberration* is an attribute of an act; the term may also mean the process of leaving the truth for the untruth. As an attribute of an act it indicates definitely a prior relation in it to a previous fact. Falseness does not express though it does imply such a relation; it is therefore narrower in meaning and marks a more dogmatic judgment. *Falship* and *falsome* are rarer terms of the same import.

Falsity in acts with peculiar subjective reference appears as *delusion*, *delusoriness*, *delusiveness*. The deed may be described as *hallucinatory* or *illusional*, according to the specific content of the mind.

The positive effort to pervert truth is observable in actions; if so the act may be *falsidical*, suggesting what is not true, or *falsific* when the actor is making false that which he knows to be true. A similar implication underlies all the derivatives of to *deceive*, though these words may be used in describing acts of unconscious deception. A *deceptive* act is usually found to be due to a definite aim on the part of the deceiver to mislead the person with whom he deals. How largely human nature has revealed this type of falsity may be seen from the accumulation of the following list of derivatives: *deceitful*, *deceitous* (Obs.), *deceitfulness*, *deceptional*, *deceptious*, *deceptive*, *deceptiveness*, *deceptivity*, *deceptory*. These words are all used in describing the acts of man. They point out precisely the same qualities.

The deceptive quality of an act may be closely associated with some specific attribute of the actor. If the act shows *guile* (*guileful*, *guilefulness*), that is, *insidious cunning*, the guilt of the doer is plainly marked in the character of the deed. In a similar manner if the deed shows *sleightness* or a *sleight* it is said to be *sleightful* and the actor is marked as a cunning person, one skilled in artfulness.

The highly psychological features of an act are plainly alluded to in the power that one mind has over another when an act exhibits a *charmingness* or a *charm* (*charmful*). If the observer is unwilling to attribute positively this quality he may characterize the act as having a *charmlike* aspect. In like manner the whole tenor of a deed may be imitative of some other deed or show the actor assuming the characters of another person; in this case it is *simulative* or *simulatory*.

Summarizing our results as to the qualities of false actions we have found that they exhibit an undefined error as to the facts related to the actor; that falsity may reside in the positive faulty action of one's intellectual processes; there may be a mere wandering from the truth; the consequences of the act may be purposely conceived; success of the false acts may depend on the ignorance of the victim; some acts involve great power of mind of the actor over the mind of the victim; the feeling and hopes of the victim may be fundamentally affected by deception.

Some acts show merely a tendency to some sort of falsity; others show the quality clearly enough but no other aspect of the situation is indicated; again the abundance of the

quality is often made known as when an adjective ending in -ful is used to describe it; the attribute may be a mere likeness to a recognized falsity of some sort; lastly the positive quality of falsity is suggested by negative terms such as untruthful.

We have now examined the methods by which we describe actions primarily intellectual that are marked by falsehood. It is to be borne in mind that we have included the more general acts, acts that may occur in any social situation or be due to any one of the countless subjective conditions which may arise in the human mind. Our interest at once suggests an immediate study of more specific types of acts but it will be more profitable to penetrate further into this same field before descending to particularities. There remains a discussion of certain concepts not otherwise provided for and the classification of persons who commit the acts already described or who share in the consequences.

Treating persons first it seems most convenient to divide them into three groups: (a) agents—those who actively perform false deeds; (b) patients—persons who receive or manifest the consequences of the false actions; (c) in whom there is no transfer of consequence from actor to patient certainly indicated. Here again other groupings of the facts are possible; but the constant interest where falsity is involved is in the dramatic situation—the doer, the deed and the consequences.

The designation of the doer is closely parallel to the description of the deed. Those who actively perform false deeds are first of all the *deceivant*, the *deceiver*, the *deceptionist*, the *deceptor*, the *falsary*, the *false* (Obs.), the *falsificator*, the *falsifier*, the *deceptr*, the *illusor*, the *mystifier*, the *mystificator*. With the exception of the last four words these terms are interchangeable in use; the *mystificator* and the *mystifier* however designate actors who effect a more pronounced confusion in the mind of the victim than does the mere deceiver. The *bluffer* and the *charmer* make more complete preparation for the deception of their victims; the *duper* makes a dupe of them. The *guiler* acts from his own corrupt nature in deceiving another. The *tricker* or *trickster* has a ready device for misleading his victim. He differs in no considerable respect from the *hoodwink* (Obs.).

The *errorist* is a teacher of false doctrines (Obs. Rare). If the knowledge imparted to another is incorrect the giver of the information is a *misinformant* or *misinformer*, generally thought to be innocent of moral offense. A *deluder* who practices illusions is an *illusionist* or *deceptionist*; if he

claims qualities or relations on false grounds he is *pretender* or *shuffler*. If he assumes the character of some one else he is a *simulator*. When pretending to be a wit he is a *flasher* or *fop* (*fopper*, Obs.); if despicably insignificant he is a *fopling*. A deluder who is frequently engaged in leading others astray is a *delusionist*.

It is to be noted that only one of the terms in this category has the feminine ending. It is too much to argue that the falsifier is only rarely a woman; it is undoubtedly true that despite the known facts woman's errors have not been grievous enough to develop a distinctive vocabulary of an appreciable size. This holds good as to the entire list of terms in the Vocabulary of Falsehood. The reason why more feminine nouns have not been brought into use is doubtless that men have taken the more active part in social affairs and so have determined the vocabulary of social relations. That we have adequate resources for discrimination in respect to sex is fully evidenced by the multiplicity of terms in use say in respect to thievery, roguery, commercial dishonesty. As a matter of fact sex lines have not entered appreciably into our judgments of falsity in human conduct.

The attributes of the agent are largely the same as those of the act. A priori we would argue that the character of the act is of course due to the character of the person. Having discussed these attributes above we present a list of terms used in describing the agent with but brief comment.

Charm, any alluring quality.

Charmful, abounding in charms.

Charmingness, power to charm.

Deceitful, full of deceit.

Deceitfulness, the quality of being deceitful.

Deceivable, having the quality or habit of deceiving, deceitful.

Deceivableness, the capacity of deceiving, deceitfulness, deceit, deceptiveness.

Deceivant, a deceiver, deceitful.

Deceptive, of the nature of or characterized by deception; that tends to deceive, mislead.

Deceptive, apt to deceive, having the character of deceiving, deceptivity.

Deceptory, apt to deceive.

Duplicity, deceitfulness.

Elusory, tending to elude, characterized by eluding.

Falsehood, (*falset*, Obs.), falseness, deceitfulness.

Falship (Obs.), untruthfulness, deceit.

Falsimony, falsity, falseness.

Falsome, deceitful, untrue.

Falsity, the quality or condition of being false, untruthfulness.
Figmentitious, addicted to framing figments.

Fopical, befitting a fop.

Foppery, silly affectation of elegance.

Foppish, resembling or befitting a fop.

Foppishness, character befitting a fop.

Guile, insidious cunning, deceit.

Guileful, deceitful.

Illusive, that tends to illude or deceive by unreal appearance.

Sleighty, possessed or making use of sleight or craft, crafty, subtle.

Trickish, given to or characterized by tricks or trickery.

Trickiness, trickishness, given to fraud or trickery.

Untruthfulness, the quality of falsity.

Wily, given to the use of cunning, wily devices.

The patient is one who suffers when a false deed transpires. One person acts, another is the recipient of the consequence. From the material at hand we conclude that some form of the verb is usually employed as a denominative, for the list of substantives expressly signifying the patient is small. The *hallucinator* is afflicted with hallucinations. The *delusionist* is one given up to delusions. It is not to be doubted for an instant that he may originate his delusions but he may also be led into them by another agency. A *dupe* is one who allows himself to be deceived; he is also a *fool*. A *gull* is a credulous person, easily imposed upon; if his social rank is not high he may be called a *sucker*. If the dupe is employed on a considerable undertaking he is a *tool*.

The attribute or qualities of the patient are more completely represented by special terms. They are as follows:

Deceivability, capacity of being deceived (Rare).

Deceivable, capable of being or liable to be, deceived, fallible (Rare).

Deceivableness, liability of being deceived.

Deceptibility, aptness to be deceived.

Deceptible, apt to be deceived.

Delusable, capable of being deluded, deludable.

Dupery, the condition of one who is duped.

Gullage, deception, the state of being gulled.

Hallucination, the mental condition of being deceived or mistaken, or of entertaining unfounded notions; the apparent perception by an abnormal person of an external object when no such object is present.

Hallucinatory, characterized by, pertaining to, or of the nature of, hallucination.

Illusion, the fact or condition of being deceived or deluded by appearances, when in a normal state; a mental state involving the attribution of reality to what is unreal; a false conception or idea; a deception or delusion, fancy.

Illusionable, liable to illusion.

Mystification, the condition or fact of being mystified.

Sweet, gullible, easily deceived.

We have been constrained to adopt the class "concept" in our system of rubrics for this discussion for the reason that in addition to the descriptions of acts and persons our language shows that we can note falsity in its various forms without indicating to what the quality belongs. The notion is so general that it is applicable to persons, acts, literature, situations of many sorts and so forth. In the previous discussion we have positive data showing that acts and persons are fully discriminated in respect to falsity in its many aspects. But this did not exhaust the facts at hand.

A *deception* is anything that deceives the mind with a false impression, a delusion. An *err* (Obs.) is an *error*, a *fault*, a *heresy*. An error may be a *delusion* or *trick* (Obs.) or a *mistake*. A *fallacy*, commonly reserved for logical terminology, also denotes deception, guile, trickery or a deception, a trick or deceitfulness, a delusion, an error and the condition of being in error. *Falsehood* signifies not merely an untrue statement but also an error or mistake, a piece of deception or falsification. *Falsity* is a more abstract concept than falsehood; it denotes error without implication of the conditions under which the error exists.

A *fiction* is a supposition known to be at variance with the facts, but conventionally accepted. A *figment* is a product of fictitious invention. A *fool's paradise* is a situation conceived to be fortunate when such is not the case. A *half-truth* is a proposition conveying a half or a part only of the truth. "A half truth is often a falsehood." An *illusion* is something that deceives or deludes by producing a false impression. Experience with illusions has resulted in a definite theory of the world which holds that the material world as a whole is an illusion.

Misintelligence is wrong, false, or erroneous news or information or misunderstanding of correct statements (Obs.). *Misinterpretation* is misconstruing the significance of language signs; it is due to a false impression.

A *quirk* is a trick, a piece of subtlety, a shift or evasion. A *reservation* is something kept back, a secret. A *untruism* is something obviously untrue. A *misconcept* is an erroneous concept.

An additional list of attributes will now be presented. *False* has several broad meanings of which one is important at this point. It signifies erroneous, wrong as applied to opinions, propositions, representations.

That which is productive of hallucinations is *hallucinative*. That is *illusive* which tends to illude or deceive by unreal appearances; is productive of illusion or false impression. *Misapprehensible* is applicable when the fact concerned may be misunderstood by human intelligence; if the fact can be misconceived as to the relation of its constituents it is *misconstruable*, or *misintelligible*. If the meaning may be mistaken, the fact, opinion or proposition is *misinterpretable*. If the sign or symbols, the various devices for giving information naturally fail in their effect they are *misrepresentative* and give rise as a matter of course to mistakes.

A *quirky* thing is full of quirks, shifts or tricks. If *truthless* it lacks truth or reality, it is untrue, contrary to fact or falls short of some standard of correctness. In this sense untruth and *untruthness* may have the same import. *Mock* denotes a quality imitative of a genuine attribute. *Mere-tricious* is applied where an object seeks high evaluation without real justifications. If *fictitious* the article or thing has only the form of reality; it is an *artificial* thing, a *bogus* entity.

In the field of logic a few broad concepts have been reserved for treatment in this connection. A *false judgment* is an opinion, thought or idea that does not agree with the facts. *Antilogic* is a false and spurious logic, a piece of vicious reasoning. When applied to duties and similar subjects it becomes *casuistry*. A *fallacy* is a piece of deceptive or misleading argument, a *sophism* or course of sophistical reasoning. The sophistical nature, the unsoundness of an argument is typically pointed out by this concept. The *pathetic fallacy* occurs when the falsification of the object results from the intrusion of the self, constituting the typical sentimental crime. If only a *fallacious* proposition is under consideration it may be called a falsehood. A *paralogism* is broadly speaking any logical fallacy; more narrowly a fallacy of which the speaker is unconscious. A *man of straw* is an artificial logical fallacy set up so that the speaker may exhibit his positive argument while overthrowing the error of the fallacy.

That is *fallacious* (*fallace, paralogic, paralogical*) which contains a fallacy and so exhibits fallaciousness, fallacity or a paralogism. At the same time falsehood or falsity, *want of conformity* to truth is apparent.

We have completed a survey of the judgments recorded

in our language on the matter of intellectual falsehood. A few observations covering the whole body of facts are in order. One is early impelled to enquire as to the frequency of metaphorical expressions in this list of terms. They are surprisingly few. Ruling out primitive metaphors which have led to a very large number of new meanings that since time immemorial have been recognized as the literal significations of words, we may venture on a tentative list of metaphorical expressions taken from the data given above. The use of judgments employed in mathematical processes to describe errors of non-mathematical thinking is the first instance to be noted: miscalculate, miscompute and the like. The transfer of meaning is certainly easy and natural and is a distinct addition to the vocabulary of falsehood. A discussion of the origin of gerrymander has already pointed out its figurative use in the present connection.

All judgments resorting to variation from a pathway in which one is supposed to walk are distinctly dependent on a metaphor: misstep, err, wander and the like. Archery furnishes one term in to overshoot the mark. Misconception is taken from a race-wide experience and aptly preserves the Socratic doctrine of maieutics. Misconstruction is reminiscent of the builder. Mystification is based on one's experience in making his way through some sort of mystery. Hoodwink points to an artificial blinding of the eyes.

The well known arts of the magician and juggler furnish us with the charm and the enchantment. Hallucination and illusion are employed in a metaphorical sense as well as in the original psychological sense. The known possibilities of deceiving a person as to the actual composition of the foods of which he partakes furnishes an apt term in to feed. The habits of the fox enable us to describe neatly the cunning deceiver. Hunting has given us the gull. A cruder figure is that by which a deceiver is said to suck his victim. Purely physical movements of the body have suggested reservation, shuffle, elusory.

Wide of the truth is based on common spatial judgments. Sweet is derived from a remote analogy with the ease with which one takes in a sweet food product.

We have completed a survey of the judgments recorded in our language on the matter of intellectual falsehood. The facts show that like a poison injected into the circulation falsity has permeated to the minutest of our rational processes. While discrimination could conceivably be carried into much greater detail it is clear that with the tools available our descriptive powers may record every type of intellectual

falsehood that human perspicacity may discern. The facts presented in their unvarnished state are in themselves worthy of study. Human intelligence has discovered its own weakness, has marked the pitfalls. It has branded the more serious offenders against intellectual truth and accuracy with epithets that cannot be shaken off. It has taken note of men and women who for any reason are the cause of their own errors. It distinguishes the intentional from the unintentional error. The actor is adequately labelled and the one who experiences the consequences of his skill in deception is fully described.

The falsity of careless or even of ordinary thought processes commands the larger part of the list presented; but unmistakable judgments are also in evidence showing that strictly logical argument is also vitiated by various means until in fact it may become mere sophistry.

Let us also affirm with M. Duprat: "*L'étude qui précède a montré que le mensonge est un fait aisé à constater dans toutes les civilisations, dans toutes les classes de la société, à tous les âges et quel que soit le sexe. Malgré la diversité de ses formes, il peut être défini en général: un moyen de suggérer l'erreur, ce que l'on sait ou croit être l'erreur. . . . La lutte contre le mensonge est une partie de la lutte pour la moralité.*"⁴ None of us can be satisfied with the discovery of the universality of falsehood as a mere scientific fact. At once we are hurried on to the problem of limits that each individual should place upon the encroachments of falsity in his own attitudes and acts.

⁴ Duprat, "*Le Mensonge*," etc., pp. 181, 184.

ONE HUNDRED JUVENILE DELINQUENTS TESTED BY THE BINET SCALE

By **RUDOLF PINTNER**
Ohio State University

The relation between delinquency and the mentality of the delinquent is one of the most important problems in the field of juvenile delinquency at the present moment. In its practical aspect it is of increasing importance for the correct disposition of the large numbers of children that are daily being brought before our juvenile courts, so much so that the best equipped courts are already provided with psychopathic laboratories for thorough study of the wards of the court. The success or failure of probation systems depends largely upon a proper understanding of the psychology of the delinquent. The Big Brothers and the Big Sisters ought to know the mentality of their little brothers and little sisters, if they expect success to follow their efforts. The failure of a child to make good is often due to inherent feeble-mindedness. He cannot respond as the normal child would respond and the "big brother" naturally gets discouraged without understanding the real cause of the failure.

Theoretically this question brings us face to face with the problem of moral deficiency, and raises the much discussed point as to whether moral deficiency may exist without mental defect. Is there such a thing as a delinquent who is mentally normal? On the one hand we have the writers who claim that delinquency in itself is a sign of mental inferiority, and on the other hand we have those enthusiastic social workers who believe that practically all our bad boys and girls are bad because they have not had a chance to be good; that little Tommy is a bad boy because of the miserable environment in which he has been brought up, and that if we transplant Tommy to a normal healthy environment he will prove every time to be a normal healthy boy. Both of these extreme positions seem to the writer not to be justified by the facts.

The present study ¹ is based upon the results obtained from

¹ The writer wishes to acknowledge the courtesy and co-operation shown to him by the chief probation officer, Miss Virginia Murray, and to all the other officers of the court.

testing by the Binet-Simon Scale one hundred delinquents at the Columbus Juvenile Court. The children tested were those who, for various reasons, were held for longer or shorter periods in the Detention Home, either awaiting trial or waiting to be disposed of according to the order of the court. The charges ranged from the most trivial offences such as slight incorrigibility (throwing stones, etc.), to the more serious offences of stealing, burglary, and gross immorality. The distribution of offences is shown below under the inclusive heads of Stealing, Immorality, Incorrigibility and Truancy.

Offence	Boys	Girls	Total
Stealing.	29	0	29
Incorrigibility.	16	5	21
Immorality.	3	27	30
Truancy.	15	5	20
	63	37	100

The ages of the children ranged from seven to twenty. All of the children were tested by the writer himself and in no instance was any insuperable difficulty found in getting the children to answer the questions. Indeed, as has been pointed out by other workers, most of them seemed to become immediately interested, and tried to do their best. They were not only willing to answer all the questions, but were ready to tell all about their delinquencies with great frankness, often however with little regard for the truth. Reticence and truthfulness are not common characteristics of the juvenile delinquent.

Goddard's revised form of the Binet-Simon Scale was used. The Fifteen and Adult tests were made use of whenever feasible. The mental age was calculated in the usual way, except that double credit was allowed for any test accomplished correctly in the Fifteen and Adult tests. It was felt that since there are no tests for Fourteen, it might be presumed that a child answering a fifteen-year-old test correctly would have been able to answer at least one fourteen-year test, if such existed. This method was used in order to approximate a little closer to the probable real mental age of the child. It allowed a more correct computation of the number of years of retardation in each case.

In this study those children will be called normal who test 12 years or more, and also those where the amount of retardation does not exceed 1 year. Backward children are those who are retarded from 1.1 to 3 years. Feeble-minded children are those who are retarded 3.1 or more years. It

should be noted that by allowing double credit for the Fifteen and Adult tests the so-called indeterminate class of children testing 11 or 11 and a fraction is avoided. Those who are able to pass some of the higher tests raise their mental age above 12, and those who are unable to do so can be classed as feeble-minded or backward. The writer is well aware that these Fifteen and Adult tests are as yet not standardized with sufficient accuracy, but they do seem of such a nature as to help out in coming to some decision in regard to the so-called indeterminate cases. The difficulty, of course, will not be definitely settled until we have properly standardized tests for the higher ages.

Of the one hundred cases only two tested above age, and in both cases by a very slight amount, i. e., +0.4 and +1.0. This is not very significant since the number of children aged 12 and below is only 23, as contrasted with 78 who are 13 and over. The number of normal children is 33, backward 21 and feeble-minded 46. Of the 46 feeble-minded 12 tested between XI and XII, 19 between X and XI, 8 between IX and X, 6 between VIII and IX, and 1 between VII and VIII. This is according to my method of calculating.

If we discard the Fifteen and Adult tests, as is often done, and count as normal those testing XI and above, and feeble-minded those X and below or more than three years retarded, we get 57 normal and backward children and 43 feeble-minded. It is more difficult to discriminate by this method of computation between the backward and the normal child, a discrimination which I believe is very desirable.

The Intelligence Quotient, which was also calculated for all the cases, has been advocated by Stern² and employed by Bobertag.³ This quotient is arrived at by dividing the mental by the chronological age, and the child is considered feeble-minded if the quotient falls below .80. According to this method the percentage of feeble-minded would be 57, i. e. eleven more than by my method. It should be noted that of the eleven, which I consider normal and which according to the intelligence quotient would be considered feeble-minded, nine are chronologically 16 and over and test XII and above. By definition these are considered normal, because they have passed the XII tests, but the intelligence quotient, if applied mechanically, takes no account of this, and with increasing

² Stern, W. L. Über die psychologischen Methoden der Intelligenzprüfung. Bericht über den V. Kongress für experimentelle Psychologie. Berlin, 1912.

³ Bobertag, Otto. Über Intelligenzprüfungen. Zeitschrift für angewandte Psychologie. Band 6. 1912. p. 495 ff.

age demands a higher mental age. The sixteen-year-old testing 12.6 or below would be considered feeble-minded, disregarding the fact that our lack of tests above XII make it almost impossible even for the normal child to test much above 12.6. For the seventeen-year-old this upper limit of feeble-mindedness becomes 13.4; for the eighteen-year-old 14.2; for the nineteen-year-old 15 and so on. This makes the method quite inadequate so long as we have not definitely standardized tests for the higher ages, and indeed it must be added that neither Stern nor Bobertag has used the intelligence quotient with children above fifteen years of age. In fact, an intelligence quotient between .71 and .80 does not according to Stern always denote feeble-mindedness. Twenty-five per cent of his not-feeble-minded (*nicht-schwachsinnig*) come within these limits, and forty-five per cent of his doubtfully feeble-minded. On the other hand of Chotzen's⁴ 236 cases not one of the normal children tests more than two years back, whereas 28 of the feeble-minded test only two years retarded. We are therefore giving a conservative estimate when we demand a retardation of more than three years. In the two other cases which by the intelligence quotient are considered feeble-minded and which I have considered only backward, we have in No. 83 a nine-year-old testing 7, or two years retarded. For children of nine and under, more than two years' retardation is considered subnormal, but in this case the child is just two years retarded. A nine-year-old by the intelligence quotient method would have to test at least 7.2 to be considered normal. The other case, No. 95, is a thirteen-year-old boy testing 10.1 or 2.9 years retarded. This amount of retardation is scarcely sufficient in a thirteen-year-old child to call for a diagnosis of feeble-mindedness. This method demands at least a mental age of 10.4 for a normal thirteen-year-old. Theoretically if we proceed to the lower limits of the scale, the intelligence quotient would consider a four-year-old testing 3.2 as feeble-minded. It seems to me then that an intelligence quotient of .80 is too high a limit for feeble-mindedness, and further that this method is totally inadequate for children of sixteen and over. Since we have no tests for the higher ages, we must define normality as being equivalent to a mentality of 11 or 12 as the case may be. Kuhlmann⁵ would seem to favor the use of the intelligence

⁴ Chotzen, F. Die Intelligenzprüfungsmethode von Binet-Simon bei schwachsinnigen Kindern. Zeitschrift für angewandte Psychologie. Band 6. 1912. p. 411 ff.

⁵ Kuhlmann, F. Feeble-mindedness. Psychological Bulletin, XI, 6. June, 1914.

quotient, and criticises such a method of determining feeble-mindedness as I have employed. But the intelligence quotient for children of fifteen and above is, as I have pointed out, practically useless, and about half of my cases belong in this category. Of course, in the higher ages the difference between the mental and the chronological age is surely by no one supposed to indicate the amount of retardation, because of our lack of higher mental tests.

Table I gives the distribution of the children according to chronological age. The average mental age for each chronological age is given in the fifth column, and it is interesting to note that only in age sixteen does the average mental age rise above the age which we have taken to denote normality, and this is accounted for by the fact that among the sixteen-year-olds there are eight normal and only five feeble-minded. In the sixth column the average basal age is given, and in none of the groups does it rise above nine years. In the seventh column the average difference between mental and chronological age is given. This is not to be taken as denoting that amount of actual retardation with children above 15 years of age. In the eighth, ninth and tenth columns the distribution of normal, backward and feeble-minded children is shown. It should be noted that above the age of fifteen we cannot because of our lack of higher tests discriminate between the normal and the backward. Those who attain a mentality of 12 or more are all classed as normal. Without doubt many of these so-called normal children are certainly backward children. The left half of the table gives the average mental and the average basal ages for the three groups of normal, backward and feeble-minded children. It will be seen that in general the average mental age of the normals is not much above 12, but this means little in itself since we are approaching the natural limits of the scale. Only in one age does the average mental age of the feeble-minded reach 11 and that is in age eighteen, where the two feeble-minded children tested 11.7 and 10.3 respectively. The average basal age is interesting. For the normal children of fourteen and over, it is about 10 years, for the feeble-minded it is merely 8, and only in two ages, 18 and 19, does it just manage to reach nine.

The results show about 46 per cent of the children feeble-minded. This percentage is interesting in view of other work done in this state with much the same class of children. Renz⁶ found 58 cases of feeble-mindedness out of one hundred cases tested at the Girls' Industrial Home. Similarly at the Boys'

⁶ Renz, Emilie. *A Study of the Intelligence of Delinquents. Training School, May, 1914.*

Industrial School about 45 per cent were found to be feeble-minded when tested by other workers.⁷ Miss Alice E. Beekman, a student of the writer, tested a class of 38 truant boys and found 44 per cent to be feeble-minded. The truant class is eminently the one from which a large number of our juvenile delinquents is recruited. The close agreement of these percentages by four independent workers is, I believe, worthy of note. It would seem to point conclusively to the fact that between 40 to 50 per cent of our juvenile delinquents are without a doubt feeble-minded. It is very probably their lack of mentality that is one of the great causes of their drifting into delinquency. In this connection it is interesting to compare the results obtained with 48 dependents, who were tested by me in the Juvenile Home, while being detained there until they could be disposed of or until their home conditions could be satisfactorily adjusted. Only about 23 per cent of these children belonged to the feeble-minded class.

Table II shows the same data for the dependents as Table I shows for the delinquents. No feeble-minded children below the age of eleven were found. It is merely a coincidence that all the seven fifteen-year-olds were feeble-minded. The basal age for the feeble-minded above the age of twelve is about 7 or 8, as was the case with the delinquents. The chief characteristic of this group of dependent children is their backwardness. The dependent child seems to be a backward child rather than a feeble-minded child. It is interesting to note that two children tested more than one year above their age. Not one of the hundred delinquents tested more than one year above age. The percentage of feeble-mindedness is, of course, much higher than what would be found among the ordinary school population, but it is only half the percentage of the delinquents. A still lower percentage was found in tests given to fifty children at a children's home by one of my students, Miss Mabel Rodebaugh. Only twelve per cent of this number were found to be definitely feeble-minded. Here again the backward child predominated (48 per cent). Four per cent tested more than one year above age.

It would seem then that poverty and neglect do not necessarily pave the way towards delinquency. It is the low mentality of the child that in half the cases at least makes it unable to resist the temptations which a large city brings in its way. The bad boy is not a clever boy. He is as a rule decidedly stupid. Occasionally we may find a bad boy or an immoral girl, who is intellectually bright and who is persistently delinquent. But these cases are rare. By persistently I mean

⁷ Results not published according to the writer's knowledge.

those cases in which a change to a better environment seems to have little or no effect. It would be simple and encouraging if we could account for all delinquency either by bad environment on the one hand, or by feeble-mindedness on the other. The latter we could treat in our special courts and institutions and the former would be left for our social workers to provide for. I am afraid, however, that the problem of juvenile delinquency is not quite so simple. There seems to be yet another class of bad boys and bad girls of normal intelligence whose environment does not seem to be the cause of their anti-social acts. This class I would call the moral defective, a class possessing normal intelligence but abnormal moral reactions. This is not to be confused with the so-called moral imbecile as defined by the English Mental Deficiency Act of 1913, for here we have moral deficiency merely super-added to mental deficiency. The moral defective, who is not mentally defective, I regard as the child who fails to react in the customary social manner even although he has sufficient intelligence to know how to react and to understand the consequences of his anti-social reactions. There is the child who takes a delight in stealing, who has a motive for stealing, who understands the wrong nature of his actions and who yet persists in them, the girl who is sexually immoral, who understands perfectly the stigma that attaches to such acts, who knows the dangers of such a life, and yet deliberately and without any feeling of shame chooses to continue, even although other opportunities may be held out for her. It would seem to me very desirable to have tests for this moral defectiveness, if such could be arrived at.

In regard to the results of other workers, we may note that Gifford and Goddard⁸ found 60 feeble-minded out of one hundred delinquents in the Juvenile Court at Newark, N. J. Goddard and Hill⁹ found 52 feeble-minded out of 54 girls, who had been inmates of a girls' reformatory but were then on probation. This last percentage is extremely high, due doubtless to the very select group of individuals tested. Goddard¹⁰ found 66 per cent feeble-minded in an examination of one hundred juvenile court cases. Sullivan¹¹ tested 109 female prisoners at Holloway Jail, and found their mental

⁸ Gifford, E. G. and Goddard, H. H. Defective Children in the Juvenile Court. *The Training School*, Vol. VIII, 9. Jan., 1912.

⁹ Goddard, H. H. and Hill, H. F. Delinquent Girls tested by the Binet Scale. *The Training School*. June, 1911.

¹⁰ Goddard, H. H. The Responsibility of Children in the Juvenile Court. *J. of Crim. Law and Criminol.* 1912. 3.

¹¹ Sullivan. Niveau Intellectuel de Délinquantes. *L'Année Psychologique*. t. 18. 1912. p. 341.

level extremely low. He does not, however, give any percentage for feeble-mindedness found among them. He does not think that a low mentality is of such supreme importance in the genesis of crime as is often suggested. Some of the professional criminals are, he says, of sufficiently high mentality. Of course this cannot be denied and agrees with what the writer himself found in regard to some of the juvenile delinquents tested. But, to repeat, these are certainly the exceptions and not the rule. Gruhle is quoted by Tredgold¹² as saying that 55 per cent of juvenile delinquents are psychically abnormal and 19 per cent definitely imbecile. Again Parker Wilson of Pentonville Prison in testifying before the British Royal Commission estimated that 40 per cent of the juvenile criminals were feeble-minded. Even Morrison in 1897, before he had the advantage of definite tests, estimated that "at least a third of these juveniles are below the average healthy standard in general mental power."¹³ There are, of course, writers who dissent from this view, notably Travis,¹⁴ who says that 90 per cent and probably 98 per cent of them are normal children. It is significant, however, that this opinion is not based upon any specific tests. It seems to be a mere opinion of the writer in question, and nowhere does he define what he means by normal.

On the whole then it is surprising how the results from different workers in different countries obtained by different methods agree in their estimation of the amount of feeble-mindedness among our juvenile delinquents. Each new study that appears seems to emphasize once again this fact, that about half of our bad boys and girls are bad, because they have not sufficient mentality to keep out of trouble. They drift into delinquency. This drifting is characteristic of the group. "Why did you steal that coat?" "I don't know." "Did you need it?" "No." "Can you wear it?" "No, it's far too big." "Then why did you take it?" "Oh, 'cause big Tom Wilson told me to take it." This is the kind of stupid delinquency that is typical of the children in our juvenile courts. It is this appalling mass of stupidity and low mentality that clogs the machinery of juvenile courts and reformatories, and makes the work seem at times so hopeless. I am convinced that until we recognize this and are prepared to deal with it in a suitable manner, we shall not stop the incessant procession of repeaters before the juvenile tribunal.

¹² Tredgold. *Mental Deficiency*. Second Edition. 1914. p. 30.

¹³ Morrison. *Juvenile Offenders*. N. Y., 1897. p. 107.

¹⁴ Travis. *The Young Malefactor*. p. 20.

TABLE I. DELINQUENTS

Age	Total No.	No. of Boys	No. of Girls	Average Mental Age	Average Basal Age		Average Difference	Normal	Backward	Feeble-minded	Average Mental Age		Average Basal Age	
					N	B					N	F	N	F
7	1	1	0	6.2	4	0	0.8	1	0	0	6.2	....	....	....
8	0	0	0	0	0	0	0	0	0	0	....	....	....	....
9	5	4	1	8.04	6.20	....	.96	3	2	0	8.53	7.30	7.33	....
10	4	3	1	9.75	6.75	....	.25	3	1	0	10.07	8.80	7.33	4.5
11	3	2	1	8.7	7.00	....	2.30	0	2	1	....	7.00	8.00	5.00
12	9	9	0	10.18	7.88	....	1.82	3	3	3	11.50	10.20	8.66	8.33
13	12	11	1	10.35	8.25	....	2.65	1	7	4	12.60	10.90	8.82	9.14
14	17	14	3	11.20	9.18	....	2.80	4	6	7	12.37	11.78	9.00	8.14
15	13	9	4	10.98	8.85	....	4.02	3	0	10	12.47	....	10.54	10.33
16	13	4	9	12.11	9.69	....	3.89	8	0	5	13.03	....	10.62	10.50
17	17	6	11	11.58	9.41	....	5.42	6	0	11	12.72	....	10.96	10.50
18	3	0	3	11.60	9.33	....	6.40	1	0	2	12.80	....	11.00	10.00
19	1	0	1	10.90	9.00	....	8.10	0	0	1	....	....	10.90	....
20	2	0	2	10.40	8.50	....	9.60	0	0	2	....	....	10.40	....
Totals	100	63	37					33	21	46				

TABLE II. DEPENDENTS

Age	Total No.	No. of Boys	No. of Girls	Average Mental Age	Average Basal Age		Average Difference	Normal	Backward	Feeble-minded	Average Mental Age		Average Basal Age	
					N	B					N	F	N	F
3	1	1	..	3.6	3	....	+0.60	1	..	..	3.6	....	....	....
4	4	4	..	4.55	3.25	....	....	4	..	..	....	....	....	....
5	3	..	3	5.47	4.00	....	-0.45	2	..	..	4.55	....	3.25	....
6	3	1	2	4.67	4.67	....	-0.53	1	1	..	6.20	4.00	4.50	....
7	3	1	2	7.93	6.33	....	-1.10	1	2	..	7.20	5.25	6.00	....
8	3	1	2	7.97	6.00	....	-0.06	2	1	..	8.90	6.00	7.50	....
9	6	4	2	8.85	7.00	....	-1.03	2	4	..	9.30	7.30	7.00	5.50
10	4	2	2	8.85	7.00	....	-0.90	1	3	..	11.00	8.13	9.00	6.33
11	3	..	3	9.27	7.67	....	-1.73	..	3	..	....	9.27	7.67	....
12	2	2	..	8.60	6.50	....	-3.40	..	1	1	....	9.40	8.00	5.00
13	6	2	4	10.60	8.67	....	-2.40	..	4	2	....	11.25	9.30	....
14	4	4	..	10.85	8.75	....	-3.15	..	3	1	....	11.30	9.50	....
15	7	3	4	10.44	7.71	....	-4.56	..	..	7	....	....	10.44	7.71
16	1	1	..	12.00	10.00	....	-4.00	1	..	..	12.00	....	10.00	....
17	1	..	1	12.20	9.00	....	-4.80	1	..	..	12.20	....	9.00	....
Totals	48	24	24					15	22	11				

A SURVEY OF ENTRANCE REQUIREMENTS AND RECENT TENDENCIES IN THE COURSES OF STUDY OF THE NORMAL SCHOOLS OF THE UNITED STATES

By J. O. ENGLEMAN,
Superintendent of Schools, Decatur, Ill.

The study here made is based upon data gathered, for the most part, from the catalogues of last year sent out by one hundred and eighteen state normal schools representing forty-four different states. Only schools for the whites are included, hence several schools in Southern states are not represented in the study. To simplify the task, both city and county normal or training schools are excluded from the survey. While obviously incomplete, the study is comprehensive enough to give a fairly accurate notion of the courses of study in their more general outlines, and the conditions of admission in the normal schools of the United States today.

No attempt is made to study the strictly professional phases of the normal schools' work. Other studies have been made recently, showing the present status of that important phase of their work.¹ It may be added in passing, however, that even the most cursory reading of the courses of study found in the catalogues reveals the most widespread differences of opinion among normal schools as to the value and amount of professional training required in the traditional psychological and pedagogical curricula. One western normal school trains its embryo teachers wholly in its training school, without giving psychology, principles, methods or history of education as a back-ground. Other schools require the completion of courses of all degrees of elaborateness and extent as a preparation for the practice teaching in the Model School. The lack of norms, universally accepted, in the traditional professional subjects is everywhere apparent. Below is given a complete list of the schools studied.

¹ See "A Study of Professional Work As Presented in the State Normal Schools of the U. S.," by W. H. Sanders, in *Ped. Sem.*, March, 1913, pp. 48-57.

- | | |
|--------|----------------------------------|
| State. | City in which school is located. |
|--------|----------------------------------|
- Alabama: Jacksonville; Troy.
 Arkansas: Conway.
 California: Chico; Los Angeles; San Diego; San Francisco; San Jose.
 Colorado: Greeley.
 Connecticut: Danbury; New Haven; Willimantic.
 Georgia: Athens; Valdosta.
 Idaho: Albion; Lewiston.
 Illinois: Carbondale; Charleston; DeKalb; Macomb; Normal.
 Indiana: Terre Haute.
 Iowa: Cedar Falls.
 Kansas: Emporia; Hays.
 Kentucky: Bowling Green; Richmond.
 Louisiana: Natchitoches.
 Maine: Castine; Farmington; Presque Isle.
 Maryland: Baltimore; Frostburg.
 Massachusetts: Fitchburg; Hyannis; Lowell; North Adams; Salem; Westfield; Worcester.
 Michigan: Kalamazoo; Marquette; Mount Pleasant.
 Minnesota: Duluth; Mankato; Moorhead; St. Cloud; Winona.
 Mississippi: Hattiesburg.
 Missouri: Cape Girardeau; Kirksville; Springfield; Warrensburg.
 Nebraska: Chadron; Kearney; Peru; Wayne.
 New Hampshire: Keene; Plymouth.
 New Jersey: Montclair; Trenton.
 New Mexico: Las Vegas; Silver City.
 New York: Brockport; Buffalo; Geneseo; Oneonta; Oswego; Rochester.
 North Carolina: Greenville; Greensboro.
 North Dakota: Mayville; Valley City.
 Ohio: Athens; Oxford; Kent.
 Oklahoma: Ada; Alva; Durant; Tahlequah; Weatherford.
 Oregon: Monmouth.
 Pennsylvania: Bloomsburg; California; East Stroudsburg; Kutztown; Lockhaven; Mansfield; Millersville; Shippensburg; Slippery Rock.
 Rhode Island: Providence.
 South Carolina: Rockhill.
 South Dakota: Aberdeen; Spearfish; Springfield.
 Tennessee: Murfreesboro.
 Texas: Canyon City; Denton; Huntsville.
 Utah: Cedar City.

State. City in which school is located.

Vermont: Castleton; Johnson.

Virginia: Fredericksburg; Harrisonburg.

Washington: Bellingham; Cheney; Ellensburg.

West Virginia: Athens; West Liberty.

Wisconsin: La Crosse; Milwaukee; Oshkosh; Platteville;
River Falls; Stevens Point; Superior; Whitewater.

AGE REQUIREMENTS

The minimum age at which students are admitted into the state normal schools varies from fifteen years for both men and women, the lowest age standard imposed, to eighteen years for men, the highest standard mentioned. The Terre Haute, Indiana, school has long held to the latter standard for men, admitting women at sixteen. It is alone in this requirement for men. Eleven schools admit women at sixteen and men at seventeen years; eleven admit both men and women at seventeen; one sets up a standard of sixteen and a half years for men and women; and thirty-four admit men and women at sixteen years. Three schools name fifteen as the minimum for women, and sixteen for men; while eleven admit both sexes at fifteen. Forty schools, or approximately one-third of the whole number studied, specify no minimum age limit. A few of these forty admit only high school graduates, but by far the greater number of them have courses entered by young and immature children from the eighth grade of public schools. One may well raise a question as to the capacity of the average fifteen-year-old boy or girl to profit by the teachers' training courses entered at that age. Certainly many observers are convinced that scores of young people are relatively inefficient as teachers, not so much because they were not well trained, as because they were too immature and too innocent of books and life-experiences to profit by the instruction received. Their very immaturity makes them immune to the most helpful principles and precepts to which they are exposed. One must live a while to get the "apperceiving mass" that makes appreciation, interpretation and assimilation of much needed professional teaching a possibility.

HEALTH

That teaching is coming to be recognized as no sinecure for the physically unfortunate, and that the work of the teacher is known to be arduous, making heavy drains upon her store of vitality, is clearly shown by the catalogue statements concerning health requirements for admission. As teaching be-

comes more and more a real profession, there will doubtless be a growth in the tendency towards a survival of the fittest, physically, in the teachers' ranks. Candidates for admission into a normal school sometimes present physicians' certificates stating that the candidate, for physical reasons, must be excused from the work of the school in physical training under the director. The reply of some schools is, in effect, "If you are too weak to take physical culture you are physically unfit to become a teacher." Many schools are trying to reach the public with cautions against those who are not strong entering the normal school or the teaching profession. Such a course on the part of the school pursuing it is a distinct public service, worthy of emulation by all of them.

The eight normal schools of Wisconsin exclude candidates for admission, if they are "suffering from active goitre, valvular heart trouble, tuberculosis in any form, excessive limping gait, extreme spinal deformity, epilepsy, paralysis, convulsions." A physician employed by the Board of Regents divides her time amongst the eight schools and works with the physical directors to improve the health condition of the students. Four other schools—Greensboro, N. C., Providence, R. I., Greenville, N. C., and Cheney, Wash., employ school physicians who visit the school and make inspections daily. Through replies to a questionnaire sent out to the public normal schools of the United States in 1911, Mr. Arthur Heche, of Stanford University, learned that "25 schools have medical inspection" and six others were "making efforts in that direction." Rochester, N. Y., North Adams, Mass., and Los Angeles require entering students to pass a satisfactory physical examination. Parents must certify that students are in good health and free from communicable diseases before the Trenton, N. J., school will receive them. Winona, Minn., Conway, Ark., Oneonta, N. Y., and Fitchburg, Mass., demand a certificate of health signed by the superintendent or principal of schools from which the student comes. Similar certificates, but signed by physicians, are required by at least seventeen of the normal schools of the country. Sixteen schools mention good health as a requirement for admission, but make no mention of a certificate of health being needed to gain admission for the student. Roark found just "nine states in which health is one of the conditions of admission" in 1906. A long stride has been taken since then in spite of the fact that just sixty of the schools studied fail to mention health as a requisite, though some of that number doubtless assume it and deny admission to the physically unfit. There is nothing in the catalogue statements, however, that can show

whether the rules concerning health of entering students in any case are strictly adhered to or not, though the tendency is clearly to raise the health standard both before and after admission.

MORAL CHARACTER

Twenty-two schools state that only students of good moral character will be admitted, while thirty-five others require students to "furnish satisfactory evidence of good moral character," usually in the form of a certificate signed by a minister, high school principal, or county superintendent. Half of the catalogues make no reference to the character of candidates for admission. This omission is of course not to be interpreted as meaning that these schools are not concerned about the character of their students, nor even that they are less concerned than the schools which do refer to it. But since the development of moral character is one of the great tasks of the teacher, and since the possession of such a character is a *sine qua non* in the performance of her daily tasks, it is a matter of surprise that the subject is overlooked in so many instances. The wonder is greater when one recalls the increased attention that has been given to the matter of moral education in many quarters within the last five years.

The important matter, after all, is for the school promptly to dismiss students found to be immoral. This many schools do, though again it happens that a desire for numbers may cause those in authority to wink at breaches of ethical conduct, or to keep equivocal cases from a real or feigned desire to reform them.

PLEDGE TO TEACH

In about two-thirds of the schools the student is required to sign a pledge to teach, in compensation to the state for the free tuition that is given her. Twenty-one schools specify that the teaching shall be done within the state for a period of two years after graduation. Three require but one year's teaching, while one, Hattiesburg, Miss., exacts a promise to teach for three years. Many of the schools include a clause in the pledge in which the student promises to pay tuition, and in some cases, tuition and interest thereon, if she fails to redeem her pledge. Plymouth, N. H., warns the unfaithful that she is "liable to revocation of (her) diploma and state certificate and a doom of one hundred dollars," if the pledge is broken.

More than forty schools require a pledge without specifying the length of time the student must teach, though seven of this number state that the student must promise to teach

"a period equal to the length of time spent in the normal school."

Approximately one-third require no pledge. The greater number of these cases is confined to sections of the country where high schools are not within easy reach of every elementary school graduate. This may help to explain the absence of a pledge in Alabama, Idaho, Kentucky, Nebraska, New Mexico, North Dakota, Oklahoma, Texas and Washington. The state evidently feels, in such cases, that it is under a special obligation to open the doors of its normal schools to any one who is ambitious for an education, regardless of the future use to be made of it. But it seems pertinent to inquire, indeed, why one should pledge herself to teach at all, in any case? The state requires no such pledge of its farmers, its lawyers or its doctors in schools for their professional training, though doubtless much of the instruction given in such schools proves to be as much of an economic loss to the state when given to other than future workers in those professions, as the professional work in the normal schools is when given to those who do not teach—more, indeed today, because the distinctly professional phases of the normal school curriculum,—psychology, child study, principles of education, kindergarten training and story-telling, are hardly less essential to the future mother than to the future teacher.

ACADEMIC REQUIREMENTS

A study of the scholastic requirements for admission into the normal schools exhibits the greatest diversity of standards, though in the midst of all the diversity there is abundant evidence of an approach towards a common standard, the college standard, *i. e.*, graduation from a standard high school with a four-year course, as a minimum entrance requirement. In his Report, 1911, vol. I, p. 10, the U. S. Commissioner of Education says: "There is a rapidly growing conviction that the entrance requirements for the normal schools should not be lower than that for college. * * * The conditions in some parts of the country, however, do not yet warrant this change, but the time is rapidly approaching when this requirement ought to prevail in every state." In the same report, p. 100, the Commissioner says: "There is always a possibility that state normal schools may be made so effective as to defeat the very purpose of their creation, which is to train teachers for schools outside the cities." These two statements from Mr. Claxton seem to represent, first, the ideal which the normal schools must keep before them and towards

which they are rapidly approaching; and second, the caution necessary to keep them from setting up higher entrance requirements in any given community than the community ideals and the legal scholastic standards for teachers will permit. In other words, while the normal schools ought to be leaders in the creation of public educational sentiment, and educational standards, they dare not set up standards for entrance too far in advance of the legal and popular standards of a community, or they will find themselves without pupils, while teachers begin their work without any normal training whatever. Higher legal requirements for teachers, and higher entrance requirements for the normal schools must come simultaneously to be most productive of good.

Now this study very soon made it apparent that scholastic requirements for admission cannot be considered, in the case of the normal schools, apart from courses of study, for in a given school there may be a course open only to college graduates, and still another to which even eighth grade graduates are admitted. Or, more extreme still, many catalogues, after enumerating the entrance requirements for the various courses, expressly state that correspondence with the president will probably secure the admission of a candidate, even if he belongs to none of the eligible classes. Indeed, there are six schools at present, if one may judge from the courses outlined in their catalogues, that do maintain courses of study for elementary school graduates and college graduates at the same time. However, they can scarcely be blamed more for this than can a college or university which maintains preparatory classes and graduate courses at the same time. In fact, the very glory of one of our greatest state universities is that it reaches out and down and suits its courses to the needs of all the people. It confers its academic honors upon those only who have entered by the regulation doors, but it holds itself in readiness, and in duty bound, to help any one who wishes anything it has to give. This, by the way, seems to be the status of the great rank and file of normal schools today, though in some circles the very policy which when pursued by a college or university arouses admiration, brings denunciation when pursued by a normal school.

But it is clear that the normal school courses are not yet wholly standardized. The academic entrance requirements are therefore not standardized. They cannot be while communities differ so much in their legal requirements for teachers. So long as a state has a considerable number of teachers legally entitled to teach without the necessity of first graduating from high school, just so long will it be worth while for

some of the normal schools of that state to open their doors to teachers of experience, and teachers who have begun teaching with only one, two, three or no years of high school training, that they may get additional preparation for their work. Some normal schools will long need to keep an open door for the teachers of lowest scholastic preparation that will legally admit one into the teaching profession.

COURSE OF STUDY FOR HIGH SCHOOL GRADUATES

A survey of the various courses in the normal schools shows that eighty-seven different schools outline two-year courses to which only high school graduates from standard schools maintaining four-year courses of study, are admitted. One school, Providence, R. I., has a two and one-half-year course for high school graduates; while the corresponding course in Indiana's only state normal school and Kirksville, Mo., Macomb, Ill., and Bellingham, Wash., is three years in length. This is the highest standard set in requirement for a life certificate to teach, since the eighty-seven schools referred to above issue such certificate after the completion of their courses two years long.

In the same list of eighty-seven there are seventeen normal schools with courses of three years, into which graduates of non-accredited high schools enter and fifteen with four-year courses for students who have graduated from high schools having three-year courses, and academic years of only six or seven months each.

In addition to the general two-year courses for graduates of standard high schools, many of the normal schools schedule special courses of the same length and with the same entrance requirements, but designed to train teachers or supervisors of special subjects like music, drawing, agriculture, etc. These courses are usually adaptations of the general courses, made by prescribing two years of continuous work in the subject giving name to the course, while dropping a corresponding total amount of some other subject or subjects taken in the general course. The number and name of such special courses is shown in the following summary:

- 27 schools have 2-year Kindergarten courses.
- 1 school has a 2½-year Kindergarten course.
- 1 school has a 3-year Kindergarten course.
- 17 schools have 2-year Domestic Science courses.
- 2 schools have 3-year Domestic Science courses.
- 2 schools have 4-year Domestic Science courses.
- 15 schools have 2-year Manual Training courses.

- 5 schools have 3-year Manual Training courses.
- 10 schools have 2-year Public School Music courses.
- 3 schools have 3-year Public School Music courses.
- 9 schools have 2-year Drawing courses.
- 4 schools have 3-year Drawing courses.
- 6 schools have 2-year Agriculture courses.
- 1 school has a 3-year Agriculture course.
- 5 schools have 2-year Commercial courses.
- 3 schools have 3-year Commercial courses.
- 3 schools have 2-year Physical Culture courses.
- 1 school has a 3-year Physical Culture course.
- 1 school has a 3-year Fine and Applied Arts course.

The 8 Wisconsin schools have 2-year College courses articulating with the junior year of the state university and running parallel where not identical with the 2-year normal school courses.

At least ten schools in Iowa, Indiana, Kansas, Missouri, Nebraska and South Carolina have four-year college courses leading to the B. A. degree in Education. Twenty-two schools report one-year professional courses open only to college graduates and leading to no degree, while three others report similar courses for college graduates, leading to the degree B. Pd.. The normal schools of California, Indiana, New York, New Jersey and the New England States and three in Wisconsin seem to be the only ones for entering which students must be standard high school graduates, or of equivalent scholarship.

COURSES OF STUDY FOR EIGHTH GRADE GRADUATES

The following table shows the distribution of courses found in the normal schools for graduates of the elementary schools:

- 1 school has a 1½-year course.
- 4 schools have 3-year courses.
- 25 schools have 4-year courses.
- 15 schools have 5-year courses.
- 7 schools have 6-year courses.

Graduates of the 5-year and the 6-year courses in most instances receive the life certificate to teach. Graduates of the shorter courses receive certificates that are limited, and valid for periods of years more or less nearly commensurate with the length of the course pursued. The tendency is to discontinue the short general courses having low entrance requirements, as Wisconsin has recently done with its elementary course of two and one-half years in the eight schools.

COURSES OF STUDY FOR RURAL SCHOOL TEACHERS

Though state normal schools may have been established primarily "to train teachers for schools outside the cities," it is very evident to any one familiar with the facts that in many states, if not in most of them, very few students who *graduate* from the life certificate courses ever teach again in country schools. The following paragraph by Prof. Joseph M. Gwinn, in *Education*, Vol. 28, p. 235, is significant:

"Information on whether normal graduates are finding employment in rural schools, obtained from twenty-four schools, show that of the one thousand eight hundred forty-eight graduates in 1906, but 23 per cent of those are teaching in rural schools. If five schools in the list, representing California, Minnesota and Pennsylvania, be omitted, there are but 6 per cent of the graduates teaching in rural schools."

In a recent paper read before the N. E. A., Pres. Hayes, of the Peru, Neb., State Normal School, reports that "Out of one hundred and seventy-three graduates in 1911, thirty-nine secured positions in city high schools, one hundred twenty-seven in the grades of town schools, five remained in the normal for post-graduate work and two took rural school positions."

In the LaCrosse, Wis., Normal School, out of a class of ninety-five students graduating last year from the life certificate courses, one went into a rural school to teach. And so, if accurate information were collected from all of the normal schools, there would be overwhelming evidence to show that in most sections of the country, the country schools are not taught by normal school graduates. For the most part teachers in the rural schools fall into the following classes: 1st, large numbers without any professional training whatever; 2d, teachers who have had some professional training in high school, or county training schools; 3d, those who have completed the shorter general courses in the normal schools; and 4th, those who have but partially completed the standardized normal school courses and then dropped out to earn the money with which to continue or conclude their normal school work. Full course graduates, as has been shown, go to the city schools for obvious reasons,—better salaries, better cultural advantages, more companionship, graded work, closer supervision, etc. The country schools have long been cheated out of their birthright.

The present nation-wide interest in a better rural institutional life has taken hold of the normal schools. They are endeavoring to make a contribution to the solution of rural

problems, and doing it in two ways: 1st, by the enrichment of old courses of study with electives, or new required subjects, that may tend to interest the student in country schools and country life; and 2d, by arranging shorter courses of study, with lower entrance requirements, that shall be especially suited to the sociological needs of country teachers. To this end twenty-four schools have already established rural school courses. To enter these courses, in some states at least, there must be not only an implied wish to teach school, but a signed pledge to teach *country* schools. They have developed most fully in such agricultural states of the South and West, as Alabama, Idaho, Ohio, Kentucky, Michigan, Missouri, North Carolina, North Dakota, Louisiana, Virginia and Wisconsin. In a few schools, as in Kalamazoo, Michigan and LaCrosse, Wisconsin, the rural school courses are co-ordinated and presided over by one man known as Head or Director of the Rural School Department.

In most instances the academic requirements for admission into these courses are low. At least eighteen of the normals admit eighth-grade graduates into these courses which are usually two years in length. Brockport, N. Y., Mayville, N. Dak., and Mt. Pleasant, Mich., have separate courses one year in length for high school graduates. Kalamazoo, Mich., has a similar course but a summer term longer, while Cheney and Bellingham, Wash., have two-year courses for high school graduates.

There is a considerable degree of uniformity in the rural school courses of study the country over. Agriculture, nature study, such phases of manual training and household arts as can be presented in the country schools where there is scant equipment and no special teacher, are generally found. The traditional "common branches" are reviewed, with emphasis upon methods of teaching them, and with attention to such modifications and elimination of subject-matter as make them best suited to rural conditions. Arithmetic, perhaps, lends itself most readily to adaptations suited especially to the farm, as is best illustrated by the problems included in Jessie Field's little book, "The Corn Lady," the "community arithmetic" used in the Indianapolis public schools, and the exceedingly practical arithmetic filled with problems growing out of the life-experiences of students, used in the Tuskegee Institute.

Language and Composition courses permit the same sort of adaptations to rural needs through a wise selection of themes for oral and written work, and intelligent direction of the reading that is involved in the course. Geography, too, becomes largely industrial, with the emphasis upon such for-

eign topics only as have most vital connections with the home regions. Similarly, nature study and every bit of science offered in some of the rural courses is given a practical rural bent in its applications. Then there is a special adaptation of school management to rural school conditions, where problems of seating, heating, lighting, ventilation, sanitation, decoration, program making, discipline, play, entertainment, study and recitation, all differ somewhat radically from the corresponding problems in the city.

High school subjects are included in the courses of study to a limited extent only. The brevity of the courses will permit but few subjects, and no extended treatment of these. However, music, drawing, and some high school English find a place in these courses, though there is less uniformity of practice in regard to algebra, history and other groups of studies.

Both county superintendents and normal school men feel that the rural school course is a step in the right direction, but only a step. The course must be lengthened materially, or the entrance requirements raised, just as rapidly as an enlightened community sentiment will permit. State legislation is needed, such as Indiana enacted several years ago in her "minimum salary law," and in prescribing that "only high school graduates, or candidates of equivalent scholarship," shall be eligible for a certificate to teach in any of the public schools of the state; or such as Wisconsin's legislature has enacted this spring in passing a somewhat less effective minimum salary law. But in communities, for example, where school boards, supported by public opinion, think that twenty-five dollars or thirty dollars per month is adequate compensation for a good teacher, it is idle for a normal school to maintain a rural course of two years to which only high school graduates are admitted. High school graduates who have either ability or self-respect will not pursue a course which leads only to positions offering a chance to do missionary work.

CORRESPONDENCE AND EXTENSION COURSES

A recent innovation in normal schools is the establishment and spread of correspondence and extension courses. The movement is relatively new, but already twelve schools have engaged in extension work, while twenty announce courses that can be taken by correspondence for credit. In 1906 normal schools in five states were reported as doing something in the way of extension work. To this number must be added at least fourteen more at the present time. In most

cases the catalogue statements about these courses are brief, but some of the schools have prepared special bulletins descriptive of this work. Macomb, Ill., one of the six schools to offer both of these lines of work, states in its regular annual catalogue that thirty-two teachers were enrolled last year in Correspondence, and seventy in Extension Courses. Arithmetic, Algebra, Agriculture, Bookkeeping, Commerce, Caesar, Cicero, Civics, Composition, Domestic Art, Domestic Science, Drawing, both Freehand and Mechanical, Economics, French, German, Geography, Geometry, History,—American, Ancient, Mediaeval, Modern and English—Physiology, Psychology, Philosophy of Education, Reading, Spelling, Sociology, and School Management, each has a place in the Correspondence Course of some normal school. Nearly the whole list named is offered by the Hays, Kansas, school. At least fifteen of the same list is offered by the school at Athens, Ga. Too few of the schools specify in their general catalogues the subjects offered to make a tabulation possible here. The same statement applies to the Extension Courses advertised. The Providence, R. I., Normal School, however, has conducted courses in American History, Arithmetic methods, Chemistry, Cooking, Kindergarten methods, Manual Training and Oral Reading, while Keene, N. H., has done extension work in Charcoal sketching, Basketry and Psychology.

The method of the extension work is two-fold. In some cases teachers employed in schools within easy reach of the normal come in to the school for regular class-room work on Saturdays or evenings. In other instances members of the normal faculties go out to certain centers, and there meet and instruct a class of teachers as they would do in their own class-rooms. The following may be accepted as a fair and typical statement of the best work attempted in the normal schools along this line:

The Kalamazoo, Mich., school grants "an extension life certificate to mature students who are (1) high school graduates, (2) have taught six years, and (3) under the direction of the Western State Normal School faculty have completed work as follows: (a) three summer terms in residence, (b) two years of non-resident work. This non-resident work is either (1) class work at some center within range of the school, so that an instructor can meet the students once a week,—or (2) carefully organized courses taken by correspondence." Sixty-five students have completed the extension course in this school. The catalogue states that "a higher grade of work is necessary to satisfy the requirements than the average of class residence accomplishment."—"One of

the important results has been the number of students who, after undertaking the extension course, have come to see that it was more possible than they had thought to enter upon and complete the life certificate course in residence." There is a third form of so-called extension work engaged in by many normal schools. It consists of the giving of occasional lectures, loaning of pictures, books, lantern slides and other helps, but is unsystematic, and offers no regular normal school credit, however helpful it may be. I have, therefore, ignored such examples of normal school extension work in my references to the schools that do it.

RURAL SCHOOL SOCIOLOGY

One of the most promising features of normal school curricula is the introduction into eighteen schools of Rural School Sociology, a subject perhaps included in no course of study ten years ago, and very few even five years back. In most schools offering it, it is a required part of the Rural School Course, but it is made an elective in many schools for students in other courses. The newness of the subject may justify a list of the schools offering it:

Lewiston, Idaho.	Duluth, Minnesota.
Normal, Illinois.	Mankato, Minnesota.
Emporia, Kansas.	Moorhead, Minnesota.
Bowling Green, Kentucky.	Kirksville, Missouri.
Natchitoches, Louisiana.	Keene, New Hampshire.
Farmington, Maine.	Fredericksburg, Virginia.
Worcester, Massachusetts.	Harrisonburg, Virginia.
Kalamazoo, Michigan.	Cheney, Washington.
Mt. Pleasant, Michigan.	Athens, West Virginia.

From this table it will be observed that the subject has found its way into normal schools of the North, South, East and West. Its importance would justify the prophecy that the next five years will see its introduction into most of the normal schools of the country. The following paragraphs, quoted from departmental statements about the course as offered in two different schools, suggest the nature of the work offered in most of them:

"A study of a rural community and the factors that tend to make it a success, as the grange, school farmers' club, church, young people's agricultural clubs, etc. This will bring the teacher in touch with the Country Life Movement, develop the spirit of leadership and the ability to use the forces that uplift a community."—*Year Book*, p. 71, Mt. Pleasant, Mich., 1913.

"The object of this course is to present in a brief and practical way some of the most significant facts as to the conditions of life in the country, and the relations of the rural population as a whole, and especially as regards their work, their business welfare and interests, the character of their homes, and the social influences of community life in rural sections. The various agencies which may be made to contribute to the improvement of the means of communication, the homes, the schools, and the general well-being, are pointed out and discussed. The aim of the course is to give prospective teachers in rural communities a right understanding of country life and a proper attitude towards it, so that they may arouse in the minds of their pupils a love and respect for such life, and a keener appreciation of its great and varied possibilities."—*Catalogue*, p. 77, Harrisonburg, Va., 1912.

RURAL PRACTICE SCHOOLS

While no attempt was made to study the professional courses in general, as offered in the normal schools, an effort was made to discover to what extent the new interest in country schools, as reflected by Rural School Courses, and subjects pertaining to country life, has modified the Model or Training Schools of the various normal schools. Roark found in his study (Ped. Sem., 1906, Vol. 13) that "only two schools, Terre Haute, Ind., and Monmouth, Ore., provided rural practice schools." It is found that today twenty schools have Rural Training Schools in which students may observe and do their "practice" teaching before graduating, but only seven of these Rural Practice Schools are in connection with normal schools which have definitely organized Rural School Courses. The other thirteen Rural Training Schools serve normal schools which endeavor to show to their undergraduates the possibilities of model country school teaching under typical rural conditions, but do not attempt to relate such work to a course of study prepared especially for prospective rural teachers.

Indiana, for example, has long had a model rural school for both observation and practice of the senior class of the normal school at Terre Haute, but the normal does not have a rural school course. It virtually admits none save high school graduates to any of its courses, but the legal scholastic requirements for the teachers and the high salaries paid to rural teachers under the minimum salary law of the state, make it possible for the normal school to send a considerable number of its graduates into the rural schools. California

normal schools are, for similar reasons, able to serve the rural schools with full-course, life certificate graduates. Under such circumstances the model rural school for practice purposes is no less desirable than in the case of the normal schools maintaining distinct rural school courses.

THE LANGUAGES

Latin, German, French, Greek, Spanish and Italian are the languages taught. The order just given is the order of their frequency in the list of electives. Latin is taught in ninety-one, three-fourths, of the schools surveyed. German is a close second, being offered in seventy-seven schools. French may be taken in forty-nine, Greek in sixteen, Spanish in nine, and Italian in one. The teaching of Greek in the normal schools is confined to the states Georgia, Illinois, Iowa, Missouri, Nebraska, New Mexico, Ohio, and Utah.

The character of the population readily suggests the reason for finding Spanish in some of the normals of California, Oklahoma and New Mexico, and, to a smaller extent, even Missouri. Lockhaven, Pa., announced its desire to prepare teachers for service in our Island possessions as the reason for introducing the subject into its course of study. Georgia, Mississippi, Ohio and South Carolina's Spanish courses are not accounted for, nor do we know the local reason for teaching Italian to teachers in Farmington, Me. The normal schools of New England,—Massachusetts, Connecticut, New Hampshire, and those of New York, New Jersey and California seem, in general, to offer no courses in foreign languages. They assume that it is done, or demand that it be done, in the high school, and so give themselves very largely to the strictly professional subjects, with some emphasis upon music, drawing and the newer subjects of manual training, domestic science, nature study, etc.

AGRICULTURE

An earlier paragraph called attention to the number of schools which have two or three-year agriculture courses. The number there given, however, by no means represents the part the normal schools are taking in the agricultural movement in education today. The survey shows that seventy-three schools, nearly two-thirds of the whole number, teach Agriculture to some extent. While a relatively small number, seven only, schedule distinct Two or Three-Year Agriculture Courses, to be elected by students with the same freedom that they elect Two-Year English or Two-Year Latin Courses, for example, the greater number of these seventy-three per-

mit students to elect a certain amount of work in Agriculture, even while pursuing other courses.

In the schools which offer but a quarter or at most a semester of work in Agriculture there is, of course, only a very general treatment of the most elementary phases of the subject attempted, but in many cases the normal schools give ten or twenty weeks' courses in each of a number of the following more specialized subdivisions of the general subject:

- Animal Husbandry
- Agricultural Economics
- Entomology and Bees
- Farm Mechanics and the Farmstead
- Feeds and Feeding
- Farm Crops
- Farm Management
- History of Agricultural Education
- Floriculture and Pomology
- Horticulture
- Plant Propagation
- Selection and Breeding
- Soil Fertility

As might be inferred, some of these topics represent attempts on the part of the departments of Biology, Economics and Chemistry to give practical courses in their respective fields. This is relatively easy to do because Agriculture, while preserving its own viewpoint, is of necessity a composite of a number of sciences and cannot be considered apart from their applications.

Statistics collected by the U. S. Bureau of Education indicate that 56 per cent of all the public normal schools of the United States taught Agriculture during the year 1909-1910. The present study shows that 61 per cent of the one hundred eighteen schools surveyed included it in their courses of study last year. An article written by E. O. Lyte, appearing in the Report of the United States Commissioner of Education, 1903, on the State Normal Schools of the United States, gives a historical sketch and a number of typical courses of study of normal schools of that day, but Agriculture is not mentioned at all. In some states at present the institute conductors going out to teachers' institutes from normal schools are more likely to carry with them select ears of seed corn, a score card for corn judging, and a number of bulletins issued by the U. S. Department of Agriculture than any outlines of Herbartian pedagogy or skeleton talks on correlation or "formal discipline."

DOMESTIC ARTS AND SCIENCE

Not only the total number but the list of seventy-four normal schools teaching Domestic Science and Arts is almost identical with those offering Agriculture. Ruediger² found, in 1907, that "work in domestic art and science is offered in about 10 per cent of the schools." This study shows that about 62 per cent are offering courses in it today, an increase of more than 500 per cent in six years. Sewing and cooking are the representative subjects taught in this department, but many schools have long lists of specialized electives, including

- Art needle work
- Advanced cooking
- Dietetics
- Dressmaking
- Food production and manufacture
- Home cleaning
- Home economics
- Home nursing
- Household sanitation
- Household bacteriology
- Laundering
- Millinery
- Nurse training
- Practice work in household arts
- Textiles

NATURE STUDY

This subject is taught in sixty of the normal schools, including twenty-five in which no agriculture is scheduled. As the work in most instances seems to be largely confined to studies of plant life, it might be classified as work in Agriculture. This would raise the whole number teaching Agriculture to ninety-eight. Indeed, one cannot tell with any large degree of certainty what is taught by reading names of courses in catalogues, and in this case it happens that approximately the same character of work is done in different schools under the subject headings Agriculture, Botany, Nature Study and Elementary Science. The need of a more standardized nomenclature is as apparent here as in the case of grammatical terms and names of pedagogical courses.

² Tendencies in the Normal Schools, in *Ed. Rev.*, Vol. 33, pp. 271-287—Wm. C. Ruediger.

MANUAL TRAINING

Manual Training has a place in ninety-four of the schools studied,—nearly eighty per cent of them. In a few schools there is only wood-work of an elementary nature, but in many there are separate ten or twenty-weeks' courses in each subject of some combination of

Architectural drawing	Machine drawing
Basketry	Mechanical drawing
Bent-iron work	Molding
Blacksmithing	Pattern making
Cabinet making	Pottery
Copper and brass work	Sheet metal work
Forging	Sloyd
Joinery	Venetian iron work
Leather work	Wood turning

The aim of the work in most of the schools is to give only a minimum training along this line to the grade teachers who may have to work in systems of schools employing special supervisors or directors of the work, but a score of the normal schools are attempting to prepare teachers to go out as supervisors of the subject in the grades, or as departmental teachers in the high schools of their states.

Any one interested in knowing just what any particular public normal school of the United States is doing in the manual arts, domestic economy, agriculture or the sciences, may be helped by reference to "Table 105, in the Report of the U. S. Commissioner of Education, 1910, Vol. II, pp. 1097-1103.

COMMERCIAL SUBJECTS

Under this caption come Bookkeeping, Stenography, Typewriting, Commercial Arithmetic, Commercial Law, Banking, Business Penmanship and Commercial or Industrial Geography. The latter is often given as a part of the regular courses in Geography when no other business courses are offered. Banking is in like manner a part of the work offered in a number of schools in Economics. Penmanship is offered in forty-eight schools, in most of which it is not a part of the Commercial Course; but Bookkeeping has a distinct place in forty-five schools; Stenography and Typewriting in thirty; Commercial Arithmetic in seventeen, and Commercial Law, sixteen.

The whole category of commercial subjects is relatively new in normal school curricula. Indeed, their appearance there

is one of the evidences that many if not most of the normal schools conceive it to be a part of their legitimate function to train teachers for secondary schools as well as for the elementary and grammar grades. Their right to the secondary field is not infrequently challenged by the colleges and universities, but in spite of the challenge the normal schools the country over are entering in and possessing the land in part at least. As the high schools break away from what has been termed the "domination of the universities," as they establish varied courses in response to the demand for a vocational training in the secondary schools, it becomes more and more necessary for somebody to train teachers of commercial subjects. At first the business colleges alone could furnish such teachers. But while teachers so trained were fitted for teaching on the purely academic side, they were lacking in the professional point of view that the normal schools have always endeavored to give. The latter schools, therefore, are undertaking to meet this new demand by giving to the high schools men and women who not only know these technical subjects but know how to teach them as well.

LIBRARY SCIENCE

The responsibility for training teachers in library methods and science is coming to be felt by the normal schools. With a library in every city and village, and of late in almost every district school, the need of such training is obvious. Thirty-two of the normals, therefore, are offering some definite courses of instruction in this new science. The courses usually consist of ten or twenty lessons each, though in a few instances they mean nothing more than a few informal talks by the librarian to entering students in familiarizing them with the use of the library of the school, and the rules governing it.

The aim of even the best of these courses is not to train librarians. It is, on the contrary, to enable students to use the normal school library effectively as a tool in the prosecution of their work, and then in turn pass this knowledge on to pupils in the public schools where the need differs only in degree, not in kind. Among the most helpful topics of instruction noted are the following: The use of card catalogues; value and use of reference books, such as the leading dictionaries, encyclopaedias, atlases, gazetteers, *World's Almanac*, *Who's Who*, etc. *Poole's Index* and *A. L. A. Catalogues* are studied for their respective lines of help. Cataloguing and accessioning of books, the use of pictures in school work, with a consideration of sources, selection, classi-

fication and indexing, making bibliographies, showing what is to be learned from title page, index, preface, table of contents—these and others of the sort comprise the topics that are presented to normal school students in more than twenty-five per cent of the schools of the country today.

The movement may well be thought of as a part of the still larger attempt to “teach pupils how to study,” in elementary school, high school, normal school and university even. Books and monographs are being written, lectures given, and courses offered the country over, indicating a swing of the pendulum from a consideration of the recitation, to methods of study as the really vital concern of the teacher today.

PUBLIC SPEAKING

A criticism to which the normal schools of the past have been subjected is that a subject so important as debating, public speaking or forensic exercises, has been left to the initiative of students themselves in their literary and debating societies. Public speaking was not required, and its encouragement was not undertaken by the school. An article in the *Ped. Sem.*, Vol. XIII, 1906, p. 223, contains the statement that the three schools of Tempe, Ariz., Peru, Neb., and Worcester, Mass., “make a special point of forensic training.” Today twenty-six schools include it in their curricula, while still other schools include it, doubtless, under such a heading as “Expressive Reading,” in contrast with *reading* or literature. Not only is there a remarkable increase of interest in the subject, as evidenced by its place in the curriculum, but the multiplication of student organizations along the same line, and under a semi-faculty control indicates the same tendency. Teachers are slowly throwing off the badges of their narrow professionalism, and coming more and more to be recognized as having interests, tastes and obligations in common with other members of society. With the entrance of the scholar into politics, and with the gradual socializing of the schools and their teachers, with the modernizing of the courses of study which brings the world of current interests into the school and invites the teacher to a larger participation in extra-class room life, it becomes more and more possible for a teacher who can think and speak on his feet, to extend his influence in ways not ordinarily possible a generation ago. The increasing emphasis upon public speaking is a reflection of this tendency, in part a cause, and partly, an effect.

MUSIC AND DRAWING

Judged by numerical standards, music and drawing are the most universally taught of all the subjects treated in this paper. One hundred and four schools seem to offer the latter and one hundred and ten the former. Perhaps a statement has been over-looked in some of the catalogues and they are even more generally taught than these figures indicate. The absence in so many catalogues of either index or table of contents has made it necessary to look entirely through a great many catalogues for the data desired. Under such conditions omissions are not improbable.

Courses in these subjects are not often intellectually comparable with older subjects in the curriculum. But Music and Drawing are forms of art that contribute so much to the leisure and recreational opportunities of children that they may abundantly justify themselves in every school upon this ground alone.

EQUALIZING THE EXPENSE

States adopting the policy of establishing many normal schools, frequently state as one reason for the policy their desire to equalize the burden of expense to the teachers of the state. A new school brings the advantages it can offer nearer the door of a body of students and lessens the expense of travel, thereby encouraging more teachers to take normal school courses. In New Mexico, however, where schools are few and distances great the state is equalizing the expense incurred in travel by refunding to the normal school students of Silver City the "amount of their railroad fare in excess of \$3.00 each way."

Curiously enough, Rhode Island, the smallest of the states, has conceived the notion of equalizing the normal school students' expenses in the same way, so it announces a mileage appropriation of \$4,000, to be "distributed among those students who reside in the state at such a distance that they are unable to reach the school by the payment of a five-cent fare!"—"The aid furnished to any one student cannot exceed one hundred dollars per year." Clearly the state feels justified, not merely in paying a part of the transportation expenses of its students, but at least a part of their other legitimate expenses, if they are living too far from the school to go home daily.

SUMMARY OF OBSERVATIONS AND CONCLUSIONS

1. There are great variations in practice as to the minimum age limit for admission, but the approach towards high school

graduation as a standard for admission insures an age limit that will be higher than the average school has had it in the past.

2. Medical inspection of the normal schools and a better health standard for admission are both decidedly increasing.

3. The moral character standards are not made very conspicuous in most of the catalogues, though the states almost uniformly require "evidence of good moral character" before granting certificates to teach. Nothing in this sort of study can show to what extent the moral character standards are mere "paper requirements." There is ground for the fear that excessive competition among the schools for students may sometimes result in the admission of those who are morally unfit to become teachers.

4. A common practice is to require entering students to pledge themselves to teach in the state giving them training. Two years is the popular limit for such pledge, though about one-third of the schools require no pledge at all.

5. Though there are still numerous courses open in most parts of the country (Cal., N. Y., Ind., and New England about the only exceptions) to students who have had but 8, 9, 10 or 11 years of academic training, such courses are decreasing in number, and the life-certificate courses are open only to high school graduates or their equivalent, in 75 per cent of the normal schools of the country.

6. Correspondence or extension work, or both, for credit, is already made possible for students in twenty-six normal schools, representing sixteen states, and every one of the great divisions from North Atlantic to Western.

7. Rural School Courses, Rural Training Schools, and such distinctly rural subjects as nature study, agriculture, and rural sociology are rapidly increasing in numbers.

8. Manual training and domestic science are found in 80 per cent of the normal schools. However, the surprise is not at their rapid introduction, but rather that there are any normal schools which do not offer them to-day.

9. Commercial courses, library science and public speaking are all finding definite places in progressive normal schools, the percentage and distribution of each one being such as to prophesy their being universally taught within a few years.

10. There is a growing tendency for normal schools to become teachers' colleges, with the same academic entrance requirements as the colleges have. In such cases the life certificate is granted upon completion of two years of the course (in a few cases, three) and the bachelor's degree after four years' work.

THE NORMAL SCHOOL IN CURRENT PEDAGOGICAL LITERATURE

The first characteristic of the literature of the present day dealing with normal schools is its paucity. The elementary school, high school, college and university all seem to receive very much more attention in the leading magazines and journals of the profession. It may be worthy of note that there is no publication to-day to serve as the especial exponent of normal school ideas, methods and problems, though the wide distribution of these schools, the importance of their work, the size of their combined faculties, and the complexity of normal school problems would suggest that there is a distinct place for such a medium.

In the next place, a survey of such normal school literature as has appeared recently impresses one with the shift in the center of gravity of its discussions. If a generation ago the schools were primarily busied with questions of methodology and psychological adjustment, they are as truly characterized by their sociological questions to-day. A reading of the titles named in the bibliography appended will make the truth of the foregoing statement evident. The almost kaleidoscopic changes in the elementary and secondary school curricula the past six or eight years have called for a new adjustment to them by the normal schools. The reorganization of their courses of study, the introduction of a half dozen new subjects, the duty of the normals to the country schools, the question as to their preparation of high school teachers, raising entrance requirements, duplicating college courses, granting degrees, standardizing courses of study or adapting themselves to local geographical and social conditions—these are among the questions and topics most often considered to-day.

To be sure the normal schools are not uninterested in all that is vital in educational psychology. Their departments of psychology and of education are affected by such contributions as are made by experiments within their own ranks or those of the colleges and universities; but while psychology still has a voice in saying *how* and *when* a lesson shall be presented to the child mind, *what lessons* shall be presented and what shall the schools refrain from presenting, are noisy sociological questions that the normal schools are trying to answer to-day along with the rest of the educational public. Most of the literature dealing with the normal schools at all, deals with some social aspect of their problems, therefore, whatever may be the extent of their concern with the psychology of their teaching.

In addition to the bibliography that follows, attention may be called to the bibliography of papers presented before the

N. E. A. on normal schools and training of teachers between 1864 and 1906, inclusive, and found in the Proc. N. E. A., 1906, pp. 707-711.

BIBLIOGRAPHY ON NORMAL SCHOOLS

- BALCOMB, E. E. The place of the normal school in agricultural education. Proc. N. E. A., 1912, pp. 823-832.
- BECKWITH, WALTER P. Conditions of admission to normal schools. Proc. N. E. A., 1903, pp. 566-569.
- BOHANNON, EUGENE W. The work of the normal school in the reorganization of the elementary school curriculum. Proc. N. E. A., 1912, pp. 817-823.
- BOLTON, F. E. The New Normal School Movement. Educational Review, June, 1913, pp. 56-65.
- BURK, FREDERIC. Normal Schools and the Training of Teachers. Atlantic Monthly, Vol. 81, pp. 769-779.
- BURNHAM, ERNEST. The special preparation of teachers for the rural schools through courses in state normal schools. Proc. N. E. A., 1910, pp. 583-588.
- CHAMBERS, WILL GRANT. The Latest Ideal Normal School. Journal of Pedagogy, Vol. 14, pp. 325-339.
- COOK, JOHN W. Capacity and limitations of the normal school in the professional preparation of high school teachers. Proc. N. E. A., 1907, pp. 628-636.
- DEPT. OF EDUCATION. Univ. of Oreg. Eugene. State Normal School Systems of the U. S. Bulletin, Nov., 1905, pp. 43.
- FELMLEY, DAVID. Extent to which normal schools and teachers' colleges should teach the use of school libraries. Proc. N. E. A., 1908, pp. 1087-1093.
- GORDY, J. P. Rise and Growth of the Normal School Idea in the U. S. U. S. Bureau of Ed., Bulletin, 1891, No. 8.
- GWINN, JOSEPH M. Tendencies in the Entrance Requirements of State Normal Schools. Education, Vol. 28, pp. 233-237.
- HALSEY, R. H. Conditions of admission to normal schools. Proc. N. E. A., 1903, pp. 569-575.
- HAWKINS, W. J. The attitude of the normal schools toward education. Proc. N. E. A., 1912, pp. 810-823.
- HAYES, D. W. The function of the normal school in the special training of teachers for the rural school. Proc. N. E. A., 1912, pp. 856-862.
- HARRIS, W. T. The future of the normal school. Proc. N. E. A., 1899, pp. 395-405.
- HECHE, ARTHUR. A report on the Teaching and Practice of Hygiene in the Public Normal Schools of the U. S. Jour. Ed. Psy., Vol. 2, pp. 429-439.
- HOLLAND, E. O. The Pennsylvania State Normal Schools and Public School System. 94 pp.
- KEITH, J. A. H. The function of the normal school in academic education. Proc. N. E. A., 1912.
- KIRK, JOHN R. The new normal school movement. The Educational Review, May, 1913, pp. 509-515.
- . Will the same training in the normal school serve to prepare for both elementary and high school work? Proc. N. E. A., 1907, pp. 661-668.
- . A statement of the issues now confronting the normal schools of the U. S. Proc. N. E. A., 1907, pp. 740-747.

- LYTE, ELIPHALET O. The state normal schools of the U. S. Report Com. of Ed., 1903, Vol. I, Chap. XXII.
- . What is an ideal course for a normal school? Proc. N. E. A., 1908, pp. 715-719.
- MAXWELL, GUY E. Legitimate spheres of influence for the normal school in public education. Proc. N. E. A., 1910, pp. 569-573.
- MONAHAN, A. C. The status of rural education in the U. S. Bulletin, 1913, No. 8, U. S. Bureau of Ed.
- . Agricultural education in the state normal schools. Rep. U. S. Com. of Ed., 1911, Vol. I, pp. 367-370.
- MONAHAN AND WRIGHT. Training Courses for Rural Teachers. U. S. Bureau of Ed., Bulletin, 1913, No. 2.
- MERIAM, J. L. Normal School Education and Efficiency in Teaching. Columbia Univ. Contributions to Education, 1906. 152 pp.
- MUTCHLER AND CRAIG. A course of study for the preparation of rural school teachers. U. S. Bureau of Education, Bulletin, 1912, No. 1.
- McKENNY, CHAS. Standards of Measuring the Efficiency of Normal School Students. Proc. N. E. A., 1912.
- . Geographical and Historical Variations That Exist in Normal Schools. Committee's Report, Proc. N. E. A., 1899, pp. 854-861.
- . Reports of U. S. Com. of Ed., Vol. I, 1911, pp. 100-102.
- . Reports of U. S. Com. of Ed., Vol. II, 1911, Chap. XXIX.
- . Reports of U. S. Com. of Ed., Vol. II, 1910, Chap. XXIV.
- PAYNE, WM. H. The Ideal Normal School. Proc. N. E. A., 1902.
- ROARK, RURIC N. Some Phases of the Internal Organization of State Normal Schools. Ped. Sem., Vol. XIII, 1906, pp. 221-229.
- RUEDIGER, WM. C. Recent Tendencies in the Normal Schools of the United States. Ed. Rev., Vol. 33, 1907, pp. 271-287.
- SANDERS, WM. H. A Study of Professional Work As Presented in the State Normal Schools of the U. S. Ped. Sem., Vol. XX, March, 1913, pp. 48-57.
- SEERLEY, HOMER H. Variations that exist in the normal schools of the U. S. because of geographical location. Proc. N. E. A., 1897, pp. 711-713.
- . Preliminary Report of the Com. of Eleven on a Plan of Normal School Statistics. Proc. N. E. A., 1912.
- THOMAS, A. O. The status of the normal school in education. Proc. N. E. A., 1908, pp. 704-710.
- . Who should determine standards and courses for the training of teachers? Proc. N. E. A., 1909, pp. 592-596.
- WICKERSHAM, JAMES P. Are the normal schools as they exist in our several states adequate to accomplish the work for which they were established? Proc. N. E. A., 1888, pp. 70-81.
- WILLIAMS, H. G. The place of the normal school in a system of public education. Proc. N. E. A., 1909, pp. 548-556.

A CRITICAL STUDY OF THE HILLEGAS COMPOSITION SCALE

By ISIDORE KAYFETZ,
Public School No. 84, Brooklyn, N. Y.

I. INTRODUCTION

1. *Standards and Tests for Measuring School Efficiency.* In recent years considerable interest has been manifested by both educators and laymen in the question, "Are our schools and school systems doing their work efficiently?" In order to answer this important question many cities and towns throughout our country have instituted inquiries, surveys, or investigations. These investigations are in many cases in the hands of experts in educational administration who have attempted to develop and apply so-called scientific standards and tests for measuring the efficiency of schools. The most noteworthy of these investigations is that of the Committee on School Inquiry of the City of New York conducted from 1911-1913 (7).

The subject has assumed such importance that recently a committee was appointed by the National Council of Education to study the problems involved and the methods of attacking these problems. This committee presented a report through its chairman, Prof. George D. Strayer of Columbia University. The report was printed by the United States Bureau of Education (10). It treats briefly of a number of problems under various heads as, "business administration, educational organization, the recruiting of the teaching corps, and the accomplishment of children" (10, page 5). Brief reference is made to such problems as the enforcement of the compulsory education law; special classes for the tubercular, the blind, the deaf, and the crippled; mental defectives and super-normal children; retardation, elimination, promotion, and non-promotion; the efficiency of teachers; the accomplishment of school children in the various school subjects, etc. In connection with some of the above problems reference is made to methods to be used in attacking the problems.

The report discusses briefly three main methods of measurement—"first, measurement by personal opinion; second,

measurement by comparison; or third, measurement by more or less well-established standards or units" (10, page 3). The first two methods are regarded as inadequate, while the third method is accepted as the most scientific. The report says, "It is only when we have a measuring stick which enables us to describe all of the quantities with which we deal in terms of definitely determined units that we can claim to have any adequate method of measurement" (10, page 4). Appended to the report is a bibliography of 339 titles relating to the subject of the report. No critical comment is made upon any of the articles cited. A teacher or administrator who should attempt to apply in practice any of these so-called scales or tests would experience the utmost difficulty—apart from the fact that in some cases special training or practice is required—because of the great differences in means, methods, procedure, and results in the various scales or tests under any one problem. Let us take "intelligence tests" by way of illustration. Investigators are by no means agreed as to what constitutes intelligence, what tests are most adequate and appropriate for measuring it, what procedure should be employed in giving tests, how the results should be interpreted, etc.

In the opinion of the writer the most important needs at present are the development of a scientific technique and the standardization of procedure in conducting experiments and tests, and in deriving scales. Many experiments, tests and scales are worthless because of faulty methods and procedure. Experimental and critical studies should be undertaken of the tests and scales so far proposed in order to determine their scientific validity and their applicability for administrative and pedagogical purposes. Furthermore, a series of comparative tests should be carried out in order to evaluate the various tests and scales. We are apt to be very profoundly impressed by reports of investigations, especially if they appear in ponderous volumes, interspersed with numerous tables, graphs, and statistical summaries that we do not understand. We either do not bother to read the reports and take their conclusions on faith, or else we stick to our preconceived notions about the various problems dealt with. Neither attitude is scientific. We should study the reports, particularly from the point of view of the criteria employed, and the methods and procedure used by the investigators in deriving their facts.

It is with the purpose in view of making a critical review of the Hillegas "Scale for the Measurement of Quality in English Composition by Young People" (3) that this study

was undertaken. The aim is to determine the scientific validity of the scale and its applicability for administrative and pedagogical purposes. The Hillegas scale will be discussed under the following heads, (1) aim, (2) means, (3) method, (4) procedure, (5) results, (6) conclusions. Then will follow criticisms of the scale in which its advantages and disadvantages will be pointed out as they are conceived by the present writer and by others who have either studied the scale or attempted to test it by experiment or by actual application in practice.

2. *The Need for Standards for Measurement of Accomplishment in School Subjects.* Most progressive teachers will agree that the marking system as ordinarily employed in our schools is wholly unsatisfactory, unreliable, and unscientific, chiefly because of the absence of definite standards, the subjective nature of the standards used, and the consequent variation in the estimation of results. Furthermore, teachers will also agree that the efficiency of their work would be greatly increased if some standards could be devised that would approximate the definiteness, the uniformity, the precision, and the objectivity of units of physical measurement such as those of length, weight, etc.

The problem of measuring merit in composition by means of marks is particularly difficult because of the complexity of the psychological processes involved in composition work. It would be of great service to teachers if a scale could be devised that would enable them to judge the merit of compositions, to compare the compositions of different pupils to determine relative merit, to compare the results obtained by the pupils of one class taken as a group, with the results obtained by the pupils of another class in order to evaluate material and methods of teaching, and, what is of especial importance, to ascertain whether a particular pupil has improved in his composition work, and if so, how much he has improved. The Hillegas scale purports to be such a scale, and it is maintained by its advocates that it can be used for all the purposes suggested above (15, page 214). Let us now proceed to an examination of the scale.

II. THE HILLEGAS SCALE

1. *Aim.* The aim is to derive a scale for the measurement of quality in English composition by young people.

2. *Means.* The author gives a brief descriptive but not critical summary of the work done in the derivation of standards for measuring efficiency in spelling, arithmetic, and penmanship. He makes special reference to the work done in

spelling by Rice and Cornman, in arithmetic by Rice, Stone, and Courtis, in handwriting by Thorndike. He makes no critical comment whatever on this work, the inference being that he accepts it as valid.

The composition scale was derived by an original empirical study of about 7,000 English compositions by young people. The age, sex, grade, ability, and social conditions of the writers of the compositions are not stated. The samples were obtained from various sources which are not stated, but the fact is mentioned that there was "a definite attempt to obtain particularly the very poorest and the best work that is done in the schools" (3, page 26).

3. *Method.* The collective statistical method was employed in the study. The theory of the method is explained in detail by means of description, graphs, and tables in Section 5 (3, pages 18-24). Briefly stated the main point of the method is as follows, "Differences that are equally often noticed are equal, unless the differences are either always or never noticed" (3, page 18). This principle is explained by Prof. Thorndike in two articles which were printed while the study was in progress (11, 12). The unit in the scale is "that difference which seventy-five per cent of the judges are able to distinguish. . . . When two samples are found such that seventy-five per cent of the judges agree in calling one better than the other the difference is just the difference used as the unit in this scale" (3, page 21).

4. *Procedure.* The compositions collected numbering about seven thousand were graded roughly by the author and another into ten classes. The criteria used in grading the samples are not mentioned. From these classes seventy-five samples were selected. To these several artificial samples were added in order to measure samples at the extreme ends of the scale. The poorest samples were written by adults who strove consciously to write very poor English (and they succeeded). Several samples of good work in composition were added from the youthful writings of successful authors and from the works of college freshmen. The final set of samples was composed of eighty-three selections of varying degrees of merit. The samples were typewritten and mimeographed, all mistakes of the original being carefully reproduced. Sets of these samples were sent to about one hundred individuals accompanied by the following printed request: "Please arrange these in order of merit as specimens of English compositions by young people. If there are two or more of them which seem to you to be absolutely equal in merit, give them the same number as a score. Score your

results on the accompanying sheet calling the worst specimen 1, the next worst 2, the next worst 3, and so on" (3, page 26).

The records which were made by those who sent in their returns were copied and for each sample in the set the distribution of the positions assigned by the judges was ascertained. (Table III, 3, page 29.) By comparing the positions assigned to each sample with those assigned to each other sample a determination was made of the number of judges who had considered any given sample better than any other given sample. (Table IV, 3, page 30.) The number of "better" judgments in Table IV was reduced to per cents of the whole number of judgments. (Table V, 3, page 31.)

On the basis of the judgments of seventy-three individuals a methodical selection was made from the eighty-three samples of a smaller set containing all the important gradations in quality from the poorest to the best. Several new artificial samples were added making in all a set of twenty-seven samples, which are reproduced in full on pages 32-39 (3). A number of judges were selected "whose positions as teachers, authors and literary workers implied that they were competent judges of English writing" (3, page 39). Practically the same mode of procedure was followed with the second set of samples as with the first. The results are shown in Tables VI, VII, and VIII, pages 41-43 (3). Table IX shows the absolute differences in value between the various samples in this set. This table was derived from Table VIII by expressing the per cent of "better" judgments in terms of the unit of the scale, which is the difference which exactly seventy-five per cent of the judges are able to distinguish.

In order to check the results Professor Thorndike "secured the judgments of forty-one individuals who were especially competent to judge merit in English writing" (3, page 40). The results are shown in Tables X, XI, XII, XIII (3, pages 45-48). Two more samples were added to the twenty-seven, making a total of twenty-nine, which were judged by twelve individuals. (Table XIV, 3, page 50).

As one of the first steps in the procedure the zero point of the scale was located as sample 580 "on the basis of the judgments of (1) nine men of special literary ability, five of them professors of English, of whom four are also authors of standard text-books on English composition, and four men of marked general intellect and literary ability, (2) eleven gifted teachers familiar with secondary education, and (3) eight psychologists familiar with the significance of scales and zero points in the case of intellectual abilities and products" (3, page 16). The median opinion of the twenty-eight judges

determined sample 580 as the zero point in the scale. (See table on page 17.)

5. *Results.* Altogether 202 individuals had judged one or the other sets of samples from which the scale was formed. Twenty-one of the samples were common to each of the sets. The data contained in Tables IV, VII, XI, and XV, relating to these samples, were combined and the results were reduced to per cents of "better" judgments and to absolute differences in value. These combined results are given in Tables XVI, XVII, and XVIII (3, pages 52-54). From these samples a series of ten were selected to constitute the scale. The difference in value between each sample and the next one approximates the unit of the scale. The results of the combined judgments by 202 judges of the samples selected for the scale are compared with the results for the same samples of the judgments of the forty-one judges in the control test in Table XIX (3, page 55). This table is reproduced below.

TABLE XIX

The Samples Selected for the Scale, the Differences Between Adjacent Samples and the Difference Between Each Sample and Sample 580 for Each of Two Groups of Judges.

Sample	Group of 202 judges		Group of 41 judges	
	Differences each from preceding	Differences from sample 580	Differences each from preceding	Differences from sample 580
580	...	000	...	000
595	183	183	173	173
618	77	260	81	254
94	109	369	141	395
519	105	474	*	...
534	111	585	246†	641
196	90	675	91	732
221	97	772	91	823
571	66	838	41	864
177	99	937	71	935

* This sample is not in the set judged by this group.

† This is the difference between samples 94 and 534.

In order to understand more clearly how the figures in the above table were obtained it must be repeated that the results were tabulated as follows: (1) the distribution of the various samples according to order of merit was determined; (2) the distribution according to "better" judgments was obtained

by comparing each sample with each other sample in the set and determining how many judges considered the given sample better than each of the other samples; (3) the number of "better" judgments was reduced to per cents of the total number of judgments; (4) the amount of superiority was determined by taking one hundred as that amount of difference which causes seventy-five per cent of the judges to judge one sample as better than another.

Dr. Hillegas in this study presents his results almost exclusively by means of tables. He does not describe his results fully. He describes the results shown in Table XIX as follows: "Table XIX shows the differences between adjacent samples and the absolute values for the samples of the scale. One part of the table shows the results for all the judges and the other part shows the results obtained from the group of judges described on page 40. The differences in the absolute values in the two results are surprisingly small. In no case do the values vary by a complete step in the scale, and the value of the best sample is almost the same in both results. This similarity of values indicates that the values in the scale are reasonably near the values that experts in English composition would assign to the samples" (3, page 56).

The series of ten compositions constituting the scale are reproduced below. Each selection has a number for convenience in reference, and the absolute value of each selection is also given.

(Reprint of pages 5 to 8.)

Sample 580. Value 0. Artificial sample.

Letter.

Dear Sir: I write to say that it aint a square deal Schools is I say they is I went to a school. red and gree green and brown aint it hito bit I say he don't know his business not to-day nor yeaterday and you know it and I want Jennie to get me out.

Sample 595. Value 183. Artificial sample.

My Favorite Book.

the book I refer to read is Ichabod Crane, it is an grate book and I like to rede it. Ichabod Crame was a man and a man wrote a book and it is called Ichabod Crane i like it because the man called it ichabod crane when I read it for it is such a great book.

Sample 618. Value 260. Artificial sample.

The Advantage of Tyranny.

Advantage evils are things of tyranny and there are many advantage evils. One thing is that when they opress the people they suffer awful I think it is a terrible thing when they say that you can be hanged down or trodden down without mercy and the tyranny does what they want there was tyrans in the revolutionary war and so they throwed off the yok.

Sample 94. Value 369. Written by a boy in the second year of the high school, aged 14 years.

Sulla as a Tyrant.

When Sulla came back from his conquest Marius had put himself consul so Sulla with the army he had with him in his conquest siezed the government from Marius and put himself in consul and had a list of his enemys printy and the men whoes names were on this list we beheaded.

Sample 519. Value 474. Written by a girl in the third year of the high school, aged 17 years.

De Quincy.

First: De Quincys mother was a beautiful women and through her De Quincy inhereted much of his genius.

His running away from school enfluenced him much as he roamed through the woods, valleys and his mind became very meditative.

The greatest enfluence of De Quincy's life was the opium habit. If it was not for this habit it is doubtful whether we would now be reading his writings.

His companions during his college course and even before that time were great enfluences. The surroundings of De Quincy were enfluences. Not only De Quincy's habit of opium but other habits which were peculiar to his life.

His marriage to the woman which he did not especially care for.

The many well educated and noteworthy friends of De Quincy.

Sample 534. Value 585. Written by a boy in the fourth year of the high school, aged 16 years.

Fluellen.

The passages given show the following characteristic of Fluellen: his inclination to brag, his professed knowledge of History, his complaining character, his great patriotism, pride of his leader, admired honesty, revengeful, love of fun and punishment of those who deserve it.

Sample 196. Value 675. Written by a girl in the first year of the high school, aged 18 years.

Ichabod Crane.

Ichabod Crane was a schoolmaster in a place called Sleepy Hollow. He was tall and slim with broad shoulders, long arms that dangled far below his coat sleeves. His feet looked as if they might easily have been used for shovels. His nose was long and his entire frame was most loosely hung to-gether.

Sample 221. Value 772. Written by a boy in the third year of the high school, aged 16 years.

Going Down with Victory.

As we road down Lombard Street, we saw flags waving from nearly every window. I surely felt proud that day to be the driver of the gaily decorated coach. Again and again we were cheered as we drove slowly to the postmasters, to await the coming of his majestie's mail. There wasn't one of the gaily bedecked coaches that could have compared with ours, in my estimation. So with waving flags and fluttering hearts we waited for the coming of the mail and the expected tidings of victory.

When at last it did arrive the postmaster began to quickly sort the bundles, we waited anxiously. Immediately upon receiving our bundles, I lashed the horses and they responded with a jump. Out into the country we drove at reckless speed—everywhere spreading like wildfire the news, "Victory!" The exilation that we all felt was shared with the horses. Up and down grade and over bridges, we drove at breakneck speed and spreading the news at every hamlet with that one cry "Victory!" When at last we were back home again, it was with the hope that we should have another ride some day with "Victory."

Sample 571. Value 838. Written by a boy in the Freshman class in college.

Venus of Melos.

In looking at this statue we think, not of wisdom, or power, or force, but just of beauty. She stands resting the weight of her body on one foot, and advancing the other (left) with knee bent. The posture causes the figure to sway slightly to one side, describing a fine curved line. The lower limbs are draped but the upper part of the body is uncovered. (The unfortunate loss of the statue's arms prevents a positive knowledge of its original attitude.) The eyes are partly closed, having something of a dreamy langour. The nose is perfectly cut, the mouth and chin are moulded in adorable curves. Yet to say that every feature is of faultless perfection is but cold praise. No analysis can convey the sense of her peerless beauty.

Sample 177. Value 937. Written by a boy in the Freshman class in college.

A Foreigner's Tribute to Joan of Arc.

Joan of Arc, worn out by the suffering that was thrust upon her, nethertheless appeared with a brave mien before the Bishop of Beauvais. She knew, had always known that she must die when her mission was fulfilled and death held no terrors for her. To all the bishop's questions she answered firmly and without hesitation. The bishop failed to confuse her and at last condemned her to death for heresy, bidding her recant if she would live. She refused and was lead to prison, from there to death.

While the flames were writhing around her she bade the old bishop who stood by her to move away or he would be injured. Her last thought was of others and De Quincy says, that recant was no more in her mind than on her lips. She died as she lived, with a prayer on her lips and listening to the voices that had whispered to her so often.

The heroism of Joan of Arc was wonderful. We do not know what form her great patriotism took or how far it really led her. She spoke of hearing voices and of seeing visions. We only know that she resolved to save her country, knowing though she did so, it would cost her her life. Yet she never hesitated. She was uneducated save for the lessons taught her by nature. Yet she led armies and crowned the dauphin, king of France. She was only a girl, yet she could silence a great bishop by words that came from her heart and from her faith. She was only a woman, yet she could die as bravely as any martyr who had gone before.

6. *Conclusions.* We may consider under the head of conclusions what Dr. Hillegas says concerning the use of the scale, what it measures, and what its limitations are. With

regard to what the scale measures he says, "The scale is composed of sample English compositions, the qualities of which have been determined by more than four hundred competent judges. The values which are assigned to the various samples express their quality in the same sense, though not as accurately, as millimeters express the lengths of lines. . . . A difference of two hundred in this scale is equal to twice a difference of one hundred taken in any part of the scale. Thus sample 94 with a value of 369 is a little more than twice as good an English composition as sample 595 with a value of 183. Sample 519 with a value of 474 is about one-half as good as sample 177 with a value of 937" (3, page 13).

With reference to the use of the scale Dr. Hillegas says, "The value of any English composition may be obtained by placing it beside the samples constituting the scale and determining to which it most nearly corresponds" (3, page 13). He goes into details as to how the scale is to be used and then adds, "By this method the value of any sample may be expressed as accurately as the individual cares to make it" (3, page 14).

In fairness to the author of the scale it must be stated that he does not regard the scale as absolutely perfect. He says, "No claim is made that the values given in the scale are absolutely accurate. Variation among the judges was very great, and to make a perfect scale would require the services of many more judges than it was possible to secure for this study. The scale is accurate enough to be of very great practical value in measuring the merit of English compositions written in the upper grades of the elementary school and in the high school. The scale will also serve as the basis of future efforts in this direction, and it can be refined and perfected part by part" (3, page 56).

III. CRITICISM OF THE HILLEGAS SCALE

1. *Articles Concerning the Scale.*

The Hillegas scale has aroused considerable discussion in pedagogical circles, and a number of articles have appeared concerning it in various pedagogical and scientific journals. The work was conducted by Dr. Hillegas with the assistance of Dr. Thorndike, who wrote several articles about the study while it was in progress (11, 12). After the publication of the scale an article appeared from the pen of Dr. Thorndike in which the significance and use of the scale was discussed (13). The present writer is aware of only one article which deals with the Hillegas scale experimentally, the article of

F. W. Johnson (4). Other articles merely describe the scale without any critical comment upon it (6). Still other articles criticize various aspects of the work merely on the basis of the opinion of the author of the article. While, of course, such criticisms are of little scientific value, at the same time, in some cases the authors reveal considerable critical insight and penetration. By some the character of the selections in the scale has been criticized (1, 4). Others have attacked the methods used in deriving the scale (2). The main criticisms will be presented under the following heads: (a) methods, (b) procedure, (c) results, (d) conclusions. Under the head of results the selections in the scale will be examined critically. Under the head of conclusions the applicability of the scale for administrative and pedagogical purposes will be discussed. Finally, a summary will be given of the advantages and disadvantages of the scale with several suggestions for the further study of such problems as are treated in this article.

2. *Criticism of Methods.*

(1) Hillegas' study can not be called a pedagogical experiment because it does not fulfill the requirements of such an experiment. According to Meumann (5, page 21) "a pedagogical experiment is one in which the child is the object,—of which the direct meaning and aim is the determination of the values of pedagogical means and methods." A pedagogical experiment must fulfill four conditions: "(1) The first necessity of all pedagogical experiments is the purposeful bringing together of the phenomena to be investigated; (2) voluntary change of the circumstances according to the purpose of the experimenter; (3) these voluntary changes must be guided by certain scientific purposes; (4) there must be possible a quantitative measurement of the observed phenomena" (5, page 20). Hillegas did not study the composition work of school children under normal school room conditions. He studied the opinions of "expert" judges as to the relative merit of pupil's compositions. He tells us nothing at all of the conditions under which the compositions that formed the material of his study were written. Since he loses sight of this important requirement we are warranted in assuming that the conditions were not uniform nor carefully controlled. Hillegas proposes that his scale should be used for pedagogical purposes, but it was not derived by experimental pedagogical methods. It was derived by purely statistical methods.

Experimental pedagogy employs three methods, (1) statistics, (2) experimentation, (3) measurement. Statistics are

used chiefly in the study of the physical characteristics of pupils. It is a misuse of statistical method to apply it to the derivation of standards for the "measurement" of the efficiency of pupils' work and of methods of teaching. Such a method is utterly lacking in pedagogical criteria. A result may be obtained that is valid when judged from a statistical point of view, but it may be entirely valueless when viewed from the standpoint of pedagogical standards.

(2) The scale was derived by a statistical treatment applied to opinions. The data were therefore subjective rather than objective. The scale is based upon a determination by collective statistical methods of the central tendencies of opinion as to relative merit of a number of compositions. A scale based upon the average opinion of a large number of judges is not, strictly speaking, an objective scale. The methods used in this study are substantially the same as those employed in deriving the Thorndike scale for handwriting (page 4), consequently a criticism of the methods used in Thorndike's study will also apply to those employed by Hillegas in this study. In an article on the experimental study of handwriting (2, page 28), James Drever says, referring to Thorndike's scale for measuring merit in writing,—“Now the fundamental objection to such a scale is that it can never be in any real sense objective, nor can its use by any individual give an objective determination of the merit or value of any specimen of writing. The scale is not objective, because it is simply the average of a number of individual opinions of merit, a composite portrait of a number of subjective opinions, or a ‘blurred result,’ to use Dr. Myers’ significant expression. The use of the scale by any individual teacher or investigator is vitiated through and through by individual opinion. We may doubtless get reasonably good results by using a scale of such a kind as compared with the results which would be got by estimating handwriting without a scale of any kind, but the whole idea is scientifically unsatisfactory.”

(3) The study does not state the criteria used by the judges in judging the compositions. It is therefore impossible to ascertain the common elements of their criteria. Hillegas says, “No attempt has been made in this study to define merit. The term as here used means just that quality which competent persons commonly consider as merit, and the scale measures just this quality” (3, page 13). No person, no matter how competent he may be in judging merit in composition, has any absolute standard of merit. His standard must necessarily be relative and variable. A child's composition

is one of the most complex pieces of school work. It is extremely difficult to analyze. It is made up of a number of factors—literary, psychological, and pedagogical,—each one of which is in turn exceedingly complex. Although we do not know exactly what standards the judges used we may assume that their standards were expert literary and not pedagogical. We are warranted in making this assumption because Hillegas was careful to choose judges who were “competent judges of English writing,” and for the additional reason that he refers only to literary elements, form and content (3, page 13).

3. *Criticism of Procedure.*

In order that any experiment, investigation or study may be considered scientific it must fulfill the conditions of a scientific method of investigation. It must have three stages, (1) the preliminary series, (2) the real series, and (3) the control series. The purpose of the preliminary series is to allow the observer to become accustomed to the mode of procedure and “to avoid the great change in the figures due to practice. These experiments must never be included in the results” (8, page 70). The purpose of the real series is to derive the data upon which the results and conclusions of the investigation are based. The purpose of the control series is to check the results obtained in the real series. Hillegas’ study did not fulfill the above conditions. There was no preliminary series, or rather the preliminary series and the real series were one and the same. There are errors in the results because the judges had no opportunity to become familiar with the mode of procedure, and because their judgments would have been entirely different with practice. If the same judges were asked to arrange the same compositions in the order of merit, a second time, without any knowledge of how they had arranged them the first time, the results would undoubtedly be different.

Professor Thorndike, in an article on the significance and use of the Hillegas scale, referring to the “amount of error to be expected in grading specimens of English writing” (13, p. 556) says, “three facts will be proved as such studies progress. First, the errors will be large; second, they will diminish with practice in using such a scale and with improvements in the scale itself; third, they will—at least after sufficient practice, be smaller than the errors now made by teachers in grading paragraph-writing for general merit” (13, p. 556). If the errors in using the scale are large at first, and if “they will diminish with practice in using such

a scale," why is it not also true that the errors made by the judges in arranging the compositions in order of merit were large at first, and that they would have diminished with practice?

4. *Criticism of Results.*

(1) The results in Hillegas' study are given almost exclusively in tabular form. There is very little descriptive treatment of the results. Every careful scientific investigation, in addition to graphic and tabular representation of the results should also give a full descriptive presentation of the general and detailed results.

(2) The selections in the scale have been criticized by Dall (1, page 115) and by Johnson (4). Dall says, "You cannot properly compare paragraphs based on different topics, recollections or quotations from school readers, and attempts at expression of totally distinct emotions" (1, p. 115). He regards the samples in the scale as valueless for comparison. He further criticizes them on the ground that they are not representative of real children's expression.

Johnson tested the use of the Hillegas scale by submitting eight selections taken from the actual compositions of high school pupils, to forty-two teachers of English composition in a number of high schools, normal schools and colleges. He also submitted the same selections to two other groups of judges, one consisting of five teachers of English in the University High School, and the other group consisting of sixteen graduate students taking a course in statistical study of school materials in the University of Chicago. Each judge received a copy of the Hillegas scale and was asked to grade the material carefully and independently without consulting anybody. At present we are not concerned with Johnson's results but with his criticism of the selections in the scale. He concludes that the material of the scale is not representative, because the selections are on formal subjects—history or reading in literature. They do not display any originality of thought. They are far removed from all present-day human experience. Johnson says, "It is altogether impossible to compare compositions on subjects that offer opportunity for originality of thought and expression with the formal material found in the scale which depends for its content largely upon the memory of books read or discussed in class. The scale differs in kind from the material to be measured. It is like using a yardstick to determine the weight of material in the physical laboratory" (4, p. 48). Johnson believes that the scale can be used for evaluating the elements of form in

writing, but that it is entirely inadequate for evaluating the elements of content. The present writer does not agree with this conclusion because in the first place, any material result of school work such as a composition, must be judged as a whole, and secondly, it must not be judged according to expert, adult criteria (literary, scientific, etc.), but it must be judged according to pedagogical standards.

To show that Johnson is right when he says that the material in the scale "depends for its content largely upon the memory of books read or discussed in class," let us compare one of the selections in the scale with the original of which it is a reproduction. The sample is as follows:

Sample 196. Value 675. Written by a girl in the first year of the high school, aged 18 years.

Ichabod Crane.

Ichabod Crane was a schoolmaster in a place called Sleepy Hollow. He was tall and slim with broad shoulders, long arms that dangled far below his coat sleeves. His feet looked as if they might easily have been used for shovels. His nose was long and his entire frame was most loosely hung to-gether.

The original from Washington Irving is as follows:

"The cognomen of Crane was not inapplicable to his person. He was tall, but exceedingly lank, with narrow shoulders, long arms and legs, hands that dangled a mile out of his sleeves, feet that might have served for shovels, and his whole frame most loosely hung together." Sample 196 has a comparatively high position in the scale in spite of the fact that it is purely verbal in its content. It shows no originality in either thought or expression. It is not based upon any real experience of the pupil who wrote it. When regarded from the standpoint of the question, "To what extent is this composition an expression of the individuality of the pupil?" our judgment of its value must be very low indeed.

5. *Criticism of Conclusions.*

The author of the Hillegas scale and its advocates believe that it can be used for administrative and pedagogical purposes. They believe that supervisors, administrators and investigators can use the scale for measuring the efficiency of a school or of a system of schools, in composition work. In fact the scale has already been used in a number of school surveys. It is further believed that teachers can use the scale to determine the merit of the composition work of their pupils and to evaluate their methods in teaching composition. Professor Thorndike says, "By using such scales, the absolute gain which any pupil made in any year could be meas-

ured in the same way as his gain in height, weight, wages, or pulse rate, and the results of different means and methods of teaching could be demonstrated with exactitude instead of being guessed at" (15, p. 214). It is impossible to separate the administrative and the pedagogical application of the scale. Its use for administrative purposes must be in harmony with pedagogical conditions and requirements. Now, the chief pedagogical requirement that the Hillegas scale fails to fulfill is that it regards the composition work of pupils merely from the standpoint of the result. It does not deal with the process. It does not concern itself with the question—"How did the child write the composition?" According to Meumann (5, page 310), the efficiency of a method of instruction is determined not merely by the outer result, but more so by the manner in which this result is reached. He says that it is not sufficient that a result is reached only materially, but it must be so reached that (1) the highest conceivable formal training of the mental powers of the child is secured; (2) the result must be attained by methods that are appropriate to the stage of development and to the individual endowment of the child; (3) the method must have a desirable moral effect. He points out that certain methods of instruction and of learning can strengthen the will of the child, increase his self-confidence, and enhance his self-activity, while other methods may have the contrary effect. In view of this, how is it possible to determine the efficiency of a method of teaching composition merely by measuring the result by the Hillegas scale? Meumann holds that that method of instruction and work is the best which (1) helps to attain a given school goal most quickly and completely; (2) fulfills the requirements of formal mental training in the highest degree; (3) has the most beneficial ethical effects. From the point of view of these all-important pedagogical standards the most essential thing is not, "what results did the child attain?" but, "how did he attain these results?" In the opinion of the present writer, herein lies the greatest defect of the Hillegas scale and of all other scales, tests, and systems of marking which consider merely the material results of the pupil's work, and entirely lose sight of the conditions under which the work was accomplished. In fact, Thorndike begins his report of his investigation of achievement in drawing (14, page 1) with the following words, "We measure a child's achievement in drawings by the drawings which he produces in connection with the conditions under which he produces them." If this is true of drawings, why is it not equally true of compositions? Why do we not measure a child's achieve-

ment in compositions by the compositions which he produces, in connection with the conditions under which he produces them?

F. N. Scott, in an article in which he opposes the use of the Hillegas scale in the teaching process (9), is aware of the fact that the scale is not in harmony with pedagogical standards when he says, "Suppose that instead of asking, Is this composition, written by some unknown X, better than that written by some unknown Y? we ask, Which is the more sincere expression of some growing individuality? or, Which will be more legitimately effective in its appeal to a certain audience? . . . It is quite possible that a pupil whose best work is rated 900 in Dr. Hillegas' scale, may nevertheless be degenerating instead of advancing—he may be treading the primrose path to the everlasting fire; whereas the pupil whose best work is rated 400 may be on his way to that freedom and strength and sincerity of speech which will one day make him a power for good. Viewed from the standpoint of their spiritual development, the first should be rated zero, the second 1000" (9, pp. 4, 5).

6. *Summary and Suggestions.*

The Hillegas scale was derived as the result of much patient and careful work on the part of the author and those who cooperated with him. The greatest importance of such work is that it shows that judgments of the efficiency of children in accomplishing school tasks, of the efficiency of a school or a system of schools, of the efficiency of teachers, can no longer be left to the opinion of an individual or of a group of individuals. We must derive scientific standards for such purposes, but they must be derived by scientific methods of investigation which are at the same time in harmony with pedagogical aims, conditions, and standards.

It may be true that we can get more satisfactory results in judging pupils' compositions by means of the Hillegas scale than by ordinary school marks, but the scale is wholly unsatisfactory and invalid from the scientific point of view for the following reasons.

1. The methods used in deriving the scale are faulty. They are purely statistical and not experimental-pedagogical.
2. The scale is not really an objective one, because it was derived by a statistical study of subjective data—opinions.
3. The judges determined the qualities of the compositions according to expert literary standards, not according to pedagogical standards.

4. The study was defective in its mode of procedure in that it lacked a preliminary series.

5. The selections in the scale do not represent real children's expression. They are too formal in their character, and do not display any originality of thought or expression. They are based upon verbal rather than concrete images.

6. The scale regards the composition work of pupils merely from the standpoint of the result. It does not touch the questions, "How did the children write the compositions? To what extent is each composition a real expression of the inner life of the child? What was the influence of the work on the inner life of the child?"

In closing this review the writer wishes to suggest that great caution should be exercised before we apply the results and conclusions of experiments and investigations in practice. We should rather turn our attention to the critical examination of all tests, scales, etc., with a view to determining their scientific validity. We should strive to perfect a scientific technique, and to standardize methods and modes of procedure. We should evaluate various tests, scales, etc., by a series of comparative tests. We should remember that in all pedagogical experiments we should use pedagogical criteria; that when we make the school child the object of our experimentation we must consider not merely his accomplishment, but also his capacity to do the work in question; not only the results, but also the conditions under which the results were obtained. It is only by adhering strictly to our experimental-pedagogical criteria that a scientific pedagogy will be developed.

BIBLIOGRAPHY

1. DALL, W. H. *Measuring the Merit of English Writing*. Science, 1911, Vol. 34, p. 115.
2. DREVER, J. Notes on the Experimental Study of Writing. *Journal of Experimental Pedagogy*, March, 1913, Vol. 2, No. 1, pp. 25-29.
3. HILLEGAS, M. B. A Scale for the Measurement of Quality in English Composition by Young People. Reprinted from *Teachers College Record*, Vol. 13, No. 4, September, 1912. Teachers College, Columbia University, New York, 1913.
4. JOHNSON, F. W. The Hillegas-Thorndike Scale for Measurement of Quality in English Composition by Young People. *School Review*, 1913, Vol. 21, pp. 39-49.
5. MEUMANN, E. *Abriss der experimentellen Pädagogik*. Engelmann, Leipzig, 1914.
6. NOYES, E. C. Progress in standardizing the measurement of composition. *English Journal*, Nov., 1912, Vol. 1, pp. 532-536.
7. Report of the Committee on School Inquiry of the City of New York. New York, 1913.

8. SCHULZE, R. *Experimental Psychology and Pedagogy*. (Translated from the German by R. Pintner.) Macmillan, New York, 1912.
9. SCOTT, F. N. Our Problems. *The English Journal*, January, 1913, Vol. 2, No. 1, pp. 1-10.
10. STRAYER, G. D. Standards and Tests for Measuring the Efficiency of Schools or Systems of Schools. United States Bureau of Education, Bulletin, 1913, No. 13, Whole No. 521.
11. THORNDIKE, E. L. A Scale for Merit in English Writing by Young People. *Journal of Educational Psychology*, 1911, Vol. 2, pp. 361-368.
12. ———. A Scale for Measuring the Merit of English Writing. *Science*, 1911, Vol. 33, pp. 935-938.
13. ———. Notes on the Significance and Use of the Hillegas Scale for Measuring the Quality of English Composition. *English Journal*, 1913, Vol. 2, pp. 551-561.
14. ———. The Measurement of Achievement in Drawing. *Teachers College Record*, Nov., 1913, Vol. 14, No. 5.
15. ———. *Education*. Macmillan, 1912.
16. ———. Handwriting. *Teachers College Record*, Vol. 2, No. 2.

FIRST STEPS IN VERBAL EXPRESSION

By WILLIAM E. BOHN,
Ethical Culture School, New York

The accompanying vocabulary and notes are offered as a contribution to the materials for child-study. The only features which may give them distinctive value are the notes on the development of the sentence and the arrangement of the words by months.

The child under observation is the girl R. She was born on June 12, 1910. It is necessary to bear this date in mind in order to estimate the influence of the seasons on the development of intelligence and the power of expression. In the general development of her mental and physical faculties R has been normal. Her weight and measurements have coincided rather closely with the averages for well cared-for children. She has suffered from no illness. The mother is a teacher of Greek and the father of English. They have, however, persistently attempted to shield their off-spring from the dangers which lurk in their professional tendencies. They have never used "baby-talk," but R has learned a few so-called baby words from relatives and friends. During nine months of the year R lives in a suburb of New York. Her second summer she spent on a farm by the sea in Maine and her third on a farm in Vermont.

The word-list was kept chronologically. R's parents were with her constantly during her waking hours and jotted down words as soon as they were used independently, intelligently, and intelligibly. In most cases words were recorded, not only in the month in which they first occurred, but in the order in which they made their appearance. It is believed that this method offers advantages for the study of certain important aspects of linguistic development. No attempt was made to record systematically the imperfect pronunciation of childhood. Words are classified as first used. Only in the case of irregular verbs have the various tense forms been regarded as separate words.

PREVERBAL EXPRESSION

No attempt was made to keep a complete account of R's preverbal expression, but from my notes I gather the following items with regard to it. R laughed for the first time in

her 9th week. During the following week she first endeavored to express herself by means of a series of sounds. In her 9th month she imitated the barking of a dog. In her 10th month she imitated a rooster's crow, a bird's chirp, and her father's sleeping. In her 11th month she imitated a kiss. In her 13th month, when she already used 10 or 11 words and soon before she learned to say "no," she first shook her head to indicate negation.

WORDS UNDERSTOOD AND WORDS USED

In the 14th month R's mother said to her: "R, go and pull Daddie's ear." R went immediately to her father and pulled his ear vigorously. Her own name was used for the first time in the 16th month, ear in the 15th, and pull in the 19th. Other similar incidents go to show that she frequently understood words perfectly several months before she used them.

CORRECTION OF PRONUNCIATION

Comparison with the record of Major's boy leads me to think that R's ear for pronunciation is rather exceptionally acute. From her 13th month on she pronounced most of her words quite as well as most adults. In the beginning she often reduplicated. She said: dädä, titty (kitty), byby, mamma, bahbah (bossie), wahwah (water), bäbä (bath), Bebe (Beatrice). The first word which was not reduplicated came in the 11th month. It was "baby." There was no reduplication after the 13th month. In the early months th was pronounced d; initial f was sh, ch or ts; initial j was hard g; ch was ts; initial s in combination with another consonant was sometimes dropped. Stick became 'tick; stone was 'tone; and school was 'cool. R's attention was caught mainly by the consonants. Occasionally she would invert these with rather astonishing results, as when she made god out of dog. Or she would use the one consonant which happened to strike her attention without regard for the others or for the vowels, as when she made ga out of tongue.

From the beginning R was conscious of the variations between her speech and that of her elders. Her efforts to approximate adult standards were constant. She would repeat a word many times in an effort to pronounce it correctly. Conscious correction of baby words began in the 19th month. The initial f sound was the last one to cause trouble. It was not until the 26th month that it was at last mastered. Thereafter R had almost no difficulty with matters of pronunciation.

One feature of the process of self-correction is not without

pedagogical importance. If R happened to pronounce a sound correctly the first time she had occasion to use it she never had difficulty with that particular sound. If, however, she got started wrong it was only after long and painful struggle that the sound in question was correctly produced in the words learned before the sound itself had been mastered. For example, in the 19th month fire was learned as chire. Later it became tsire. In the 26th month it was pronounced correctly. Thereafter she used this sound correctly in all the new words in which it occurred. But for a considerable time many of the original mispronunciations persisted. In general those learned earliest were the last to be eliminated.

The pedagogical lesson is obvious. It is of the utmost importance that the child should be given every possible assistance to the end that it may be started correctly in the use of each new sound. Persons speaking within the hearing of a child should take pains to enunciate unmistakably. This should be done even long before the child begins to talk, for, as has already been noted, children may understand many weeks before they speak, and understanding surely implies a lively attention to sounds.

DEVELOPMENT OF THE SENTENCE

Since the mastery of sentence forms is from several points of view more significant than the mere acquisition of words, I have in Table A put down a number of R's sentences in the order in which they occurred. For the 14th and 15th months this list includes all the sentences which were recorded and probably the only ones which were used. For the other months I have included only those which seem to indicate some advance.

The identification of a child's first sentence is more difficult than might be supposed. In the 14th month R used as one word a series of sounds which an uncritical listener would have put down as a sentence. In her bath when she managed to capture the sponge she would cry, "Here-it-is!" Though these sounds may have served the purpose of a sentence the various syllables certainly had no separate functions in R's mind. Therefore this was no true sentence. On the other hand R never made one word serve unmistakably as a sentence. When she said "dada" in the 9th month she may have meant, "This is Daddie." But what went on in her mind is merely matter of conjecture.

"Beatrice all gone," uttered on the 12th day of the 15th month, was her first sentence. Here appears the characteristic feature of infantile speech, as it is, in fact, the mark of all

primitive expression. I refer to the lack of connectives. The words absolutely necessary to the expression of a thought are used in juxtaposition long before the connectives are mastered. In this first sentence we have two notions connected. The name Beatrice has been used before; likewise the adjective phrase, "all gone." Here the two are connected merely by being pronounced together. The verb to be, which is necessary to complete expression of the idea involved, appears for the first time eight months later.

The second sentence is much more complicated. It means, Daddie will come through the door. Here we have a verb and a modifier. But the verb is incomplete and there is no preposition to express the relation which evidently existed in the child's mind between the coming of Daddie and the door. "Girls cook" was achieved when R was looking at the picture of two little girls cooking. It appears to be the first sentence which is formally correct and complete. But the verbal significance of "cook" is at least doubtful. The fourth sentence, uttered in the 17th month, indicates a great advance in the variety of ideas associated, but it is entirely without verbs and connectives. "Daddie shoes wet" is set down as an example of R's early tendencies in the treatment of inflections. Just as many ideas appeared long before the words necessary to their expression so a sense of relationships often antedated the acquisition of the grammatical apparatus requisite for making them clear. R habitually used nouns in a possessive sense depending on word order to carry her meaning. Thus she would say, "Daddie mother," "Aunt Ida house." The fact that she was never misunderstood throws a good deal of light on certain aspects of our linguistic development. The possessive form finally appeared in the 20th month.

The first sentence indubitably perfect both as to form and as to psychological implications is number six, "Daddie gave R new shoes." This masterpiece created such a glow of pride in the infant breast that R repeated it three times in order to make sure of her accomplishment. Number seven is a genuine complex sentence. R spoke it as she brought to her mother a pair of stockings to be hung up on Christmas eve. Her evident meaning was, Hang up these stocking on Christmas in order that I may get some new babies in them. Number ten is compound. The conjunction which might have been used to connect the clauses had been learned during the preceding month but had not yet been used for this purpose. Number twelve is complex and much better in form than other constructions equally complicated which preceded it. A compound sentence with a conjunction connecting the clauses

finally appears in the 20th month. In this sentence, number sixteen, appear the first infinitive and the first participle. From this time on these forms were freely and correctly used.

The sentences, "I guess that's a wheel," and "Mother acts very busy" exhibit a power of expressing comparatively fine shades of meaning by means of the newly mastered sentence forms.

DEVELOPMENT OF INTERESTS

An examination of Table B leads me to the conclusion that R's vocabulary developed in response to the demands made by her expanding intelligence rather than in accordance with the opportunities and incitements offered by her changing environment. There is, of course, the usual early preoccupation with the parts of the body, clothes and domestic objects. It is noticeable, however, that the first class of objects to claim any considerable number of additions is that placed under the heading Occupations. The child's boat, bag, and rock were more important to her than her teeth, her hair, or her stockings. After the 15th month domestic objects claim the chief attention. The child is more and more taking in things beyond the range of her personal comfort or pleasure. She begins now to talk of cooking utensils, umbrellas and pipes, objects with which she has no immediate concern. In the 17th and 18th months there comes a much greater intellectual achievement. Suddenly the child takes in the moon, the sun, the sky, the rain, and the night. Eight words relating to such objects are added in two months. Then there are none for the four months succeeding except the word snow, which was learned, naturally, in winter. That is, natural phenomena of a certain degree of prominence were learned practically at the same time and then this side of the child's development ceased for the time being. During the 19th, 20th, and 21st months the house itself divides attention with the smaller and more immediate objects within the house. The names of the various rooms are learned as well as the designations of various structural parts.

The list of words referring to animals seems to show that the seasonal element is less important than one would naturally suppose. The 13th, 14th, 15th, 25th, 26th, and 27th months came in summer and were spent in the country where wild and domestic animals abounded. The 19th and 20th months came in midwinter and were spent in the city. Yet with the exception of the 25th there is no notable variation in the number of words referring to animals learned during these months. The words turtle, goat, and robin were learned in winter when the creatures referred to lived only in pictures

and stories. The summer season furnished the interest, the incentive to investigate, the joy in contemplation, but the acquisition of words and the enjoyment of immediate observation and contact were not always coincident. Advancing intelligence may lead the child to inquire in winter about an animal seen in summer. Or the process may be reversed. Anticipation of seeing an animal may lead to questions and the addition of knowledge and words. Thus at a time later than the period covered by this record a promised visit to a zoological garden added largely to R's vocabulary many weeks before the happy event took place.

It is worthy of note that R's interest in plants came much later than that in animals. This is no doubt largely chiefly due to the fact that animals move. Hay, hay-cock, grass, and pine tree were learned in midwinter. Interest in them was chiefly occupational. Real excitement with regard to plant life came in the 23rd month. This month came between April 12th and May 11th, when the plants were doing something. From that time on through R's third summer the names of plants and their various parts and aspects followed rather closely the changing life of the season.

Words for such ideal facts as time, nothing, right, and wrong naturally came late, the number of them being largest toward the very end of the period covered by this record. The same remark may be made with regard to such words as edge, end, back, front, and other words designating position or division. The child would have no occasion to make the analysis necessary to the intelligent use of such words before having a considerable experience with the tables, boards, sticks, etc., with reference to which they are used. It is to be noted, however, that such class words as man and girl came very early in R's development and were used correctly from the beginning. In fact a considerable part of the usual baby vocabulary is made up of such terms. The child's ability to select the salient features in a complex and classify correctly individuals which differ in everything except the one important aspect may well be amazing to one who has not observed rather carefully the development of child life before the period of speech.

Consideration of the classification of verbs leads to no different conclusion. The first verbs, gallop, go, and back, referred, not to R's activities, but to those of a horse. At first she herself moved very little; she was taking in big, outside things. Even in the 15th month the verb kick was learned in connection with the activity of a calf. It is not until the 16th month that the child's own movements began

to occupy the central place. And from that time on they steadily maintained themselves. The first verbs designated as social, please and thank, had no significance; it is in the 17th month that hurt and keep indicate a real growth of social sense. From the 20th month on appear at irregular intervals such words as tell, hear, like, follow, love, and celebrate. The earliest attention to purely intellectual activity is indicated by the acquisition of know in the 19th month. Learn, guess, and mean, in the months immediately following, show that this interest was real and cumulative at this time.

The classification of adjectives exhibits little that is worthy of remark. At first there are the absolutely necessary quantitative modifiers, more, big, etc. From the beginning, however, the majority are qualitative and have reference to physical characteristics. The next noticeable fact is the early eruption of qualitative adjectives referring to moral qualities. This, however, lacks the significance which cursory examination would lead one to assign to it. Good and nice probably meant agreeable or acceptable. Dear was used with signs of endearment, but these may have been largely the result of imitation. Careful was undoubtedly used with a real sense of its meaning, but R's associations with it may have been purely physical. It is not until the 21st month that there is an unquestionable use of adjectives in a moral sense. Better, naughty, and bad were certainly used much as they are by adults. Adjectives referring to intellectual qualities occur at the same time. Joke, the first noun applicable to a purely intellectual phenomenon, comes also in the 21st month, and know, the first verb belonging to the same region, appears in the 19th.

MASTERY OF GRAMMAR

Two points in connection with R's preliminary adventures in English grammar are worth recording. Like Darwin's boy, she made a hard fight for regularity before she finally succumbed and consented to yield to the demands made by our adult conjugations. At the time when this record was brought to a close she still said brang and, occasionally, swang. Soon after this she said, "R bote Mother." When this was not accepted she changed it to "R bitted Mother," and finally, in despair, she fell back on the universal resource of childhood and said, "R did bite Mother." About the same time she said: "Fall, fell—fall, fell. Mother, what is fall? What is fell?"

An experience of R's in the formation of nouns shows with what ease a child handles regular forms. In her 27th month she used the endings *ie* and *ikin* to form the diminutive.

tives of familiar nouns. She used them correctly and with perfect ease. During the same month she was asked what instrument was used in the splitting of wood and answered promptly, "A splitter."

The other point has to do with the child's method of acquiring grammatical machinery. The child proceeds by concentrating attention on one thing at a time. Even in the addition of words to the vocabulary this principle is discoverable. This, that, these, one were acquired in the same month. The same is true of the following groups of words: china, aluminum, brass; almost, not quite; right, wrong; back, front. But in the mastering of grammatical forms this law of concentration is even more evident. Before her 19th month R used not a single preposition. During that month she used 7, nearly a third as many as she had mastered at the end of her 27th month. It was during her 20th month that R first used tenses consciously. She would say, "R will do," and then do something and say, "R did do." A little later, toward the end of the same month, her attention turned to the plural number. She would say very precisely, like one repeating a lesson: "R good girl. R and Mother good girls," with strong emphasis on the word in the plural.

During the 22nd month attention turned to personal pronouns and especially to their distinctions of gender. On one occasion a boy doll was given to her. Soon afterward she was heard to soliloquize: "Granddaddie gave him to me. Mother brushes her teeth. Daddie brushes his teeth." The emphasis was strong on the pronouns, and it is evident that they furnished the connecting links between the different parts of the soliloquy. In fact the whole speech was in the nature of an exercise. A glance at the word-list shows that R learned 6 personal pronouns during this month, as many as she had acquired during all her previous life.

Personal pronouns referring to herself gave her trouble up to her 24th month. For example, when asked, "Have you finished?" she might answer, "Yes, you have finished." On one occasion she noticed a change in her mother's appearance and said to her: "She is all dressed up—you—she has changed her dress." With gender and number she had had no difficulty since a much earlier period.

THE PROCESS OF SPEECH DEVELOPMENT AS A WHOLE

With regard to R's process of speech development as a whole it seems to me that it was largely self-conscious and that it was motivated by the nascent desire for social relations. With regard to the first point, a part of the material given

under the last heading has served, with more of the same character, as the basis for my conclusion. A few more incidents culled from my notes may serve to make the matter clearer.

In the 18th month R had learned A and B. She would read these and then point to the other letters saying, "Um; -um—um"—meaning, apparently, that she wished to learn them too. During her 19th month she got into the habit of pointing to objects for which she had no names and saying, "That?" A little later she would say, "Don't know that." In her 23rd month she framed her wish more definitely. She would say, "R want to know that." In the 21st month she soliloquized after having been left to go to sleep: "Daddie walk on grass. R walk on grass—no. Daddie walk on grass—yes. Daddie walk on snow. Snow deep. Know that word." It was at this time that R first became conscious of her personal appearance. In her 22nd month she began to "pretend." In the 24th she played she was grown up and told a story to one of her dolls beginning, "When R was a little girl." In the 26th she often asked, "What Mother and Daddie talking about?" or "What Mother reading about?" It evidently troubled her to hear words which she could not understand. Somewhat later, after the close of the period covered by this record, R invented a language for her rocking-horse. This language had a regular vocabulary and for a short time it was used consistently. This invention was probably due to the influence of R's first German lesson.

In general during this early period R gave more conscious attention to the mastery of speech than to any other one thing. It took up vastly more of her attention than food or clothes. Its only rival was physical play. But R would often stop the most engaging physical sport to get a word for some object with which she was dealing or to pay attention to the talk of her elders.

My other point, the one with regard to the child's motive for mastering so complicated a thing as the English language, is extremely difficult to prove. Yet my experience with R and some ten or twelve other young children whom I have had opportunity to observe leads me to believe very definitely that a child's motive for learning words and grammatical forms cannot be called a selfish or practical one. It is not the result of a sharp demand made by his immediate environment.

I was started on the track of this conclusion by observing that the first words learned by children are not the ones which may be put to practical use. Of the 32 words used by R

at the end of her 14th month certainly not more than half-a-dozen were utilized to secure things agreeable to her or to prevent operations or conditions to which she objected. Her vocabulary was in the main a means of expression. Bahbah (bossie) was uttered with every sign of ecstasy when a cow appeared on the scene, or it was chanted in a sort of hymn of praise when R was going to sleep or lying in her bed waiting to be taken up after waking. She did not want a cow. So far as she knew a cow was of no use to her. But the word bahbah expressed her delight in the images connected with it.

As time went on words were used more and more to establish with those about her a common basis of understanding and enjoyment. In the first months there was little communication. The great element in R's intellectual life was satisfaction in mutual identification. For example, in the 17th month R insisted on talking to a guest. She would hold up her hand and say, "Hand," or point to the door and say, "Door." She had nothing to say about hand or door. Her pleasure lay solely in establishing a common intellectual basis by identifying these objects and naming them.

A slightly higher stage, something nearer communication, had been indicated by an incident which antedated this. R saw the moon and cried, "Mamma, moon! Mamma, moon!" This was evidently not mere identification. R evidently meant, "Mamma, there is the moon." The first perfectly clear instance of communication came in the 19th month. It was in this month that R first imparted to the world a piece of information which she alone possessed. The momentous sentence which finally broke down the wall between her inner consciousness and the outside universe was: "Teeth hurt." It was pronounced with all the solemnity demanded by the occasion. But even this sentence, dealing as it did with an immediate physical fact, was not pronounced for the sake of securing any immediate physical result. The fact was communicated in a perfectly impersonal manner. It was not before her 24th month that R began to ask for things. And what was said about the vocabulary at fourteen months applies even more strikingly to that at twenty-seven. Of what use to a two-year-old child are a long list of color words and the names of a lot of flowers which the average adult could not identify?

It seems to me as clear as anything can be in this uncertain realm that the child exerts ear and eye and vocal organs in order that it may enter into the social life of the wonderful giants with whom it lives.

TABLE A

SENTENCES

- 15th Month
1. Beatrice all gone.
 2. Daddie come door.
- 16th Month.
3. Girls cook.
- 17th Month
4. Daddie, Beatrice, choo-choo, school.
- 18th Month
5. Daddie shoes wet.
 6. Daddie gave Rhoda new shoes.
 7. Hang Christmas—new babies—stockings.
- 19th Month
8. Teeth hurt.
 9. Daddie take bath.
 10. Daddie type-write, R eat bread, (pause) mamma dress.
 11. Baby nextdoor cry.
 12. R brush teeth way Daddie does.
- 20th Month
13. Let's play ball, Mamma.
 14. R likes bread, (pause) Daddie likes bread, (pause) Mamma likes potatoes, (long pause) bossies like hay.
 15. R get up on chair and look out window.
 16. R and Daddie went shopping to store and Mamma stay home to get dinner.
- 21st Month
17. I guess that's a wheel.
 18. I like hair that way; it looks pretty.
- 23rd Month
19. R been very naughty girl; wasted ink.
 20. R busy digging.
 21. This is sitting down.
 22. I want to know that.
 23. Mother acts very busy.
- 24th Month
24. Mother go to park all alone without R coming along.
 25. (Imitating Mother telling a story) When R was a little girl had dollie called Beth.
 26. When R is big girl she will eat strawberries and have big dollie and make speeches.

TABLE B—*Continued*

Month	ADJECTIVES																										
	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27								
Definitive.....										2	3																
Place.....						1					1		2		1		1		1								
Quantitative.....							1	1	1			1	2	1	4	1	1	1	1	2							
Qualitative-physical.....							2		3	3	4	2	6		1	5	10	7	3								
Qualitative-mental.....													2		2	1	2	3	6								
Qualitative-moral.....								1	2	1			1		1	1											

TABLE C
VOCABULARY

9th Month
<i>Noun.</i> Daddie.
10th Month
<i>Nouns.</i> Byby, kitty.
11th Month
<i>Nouns.</i> Mamma, baby, diaper.
12th Month
<i>Noun.</i> Man.
13th Month
<i>Nouns.</i> Bossy, water, bath, Beatrice.
14th Month
<i>Nouns.</i> Cow, stick Jove (a calf), Dotty (a calf) duck, Lady (a horse), button, girl, milk, book, ball.
<i>Verbs.</i> Gallop, go, back, walk.
<i>Adjectives.</i> Gone.
<i>Adverbs.</i> There, no, all, here.
<i>Interjection.</i> Goodbye.
15th Month.
<i>Nouns.</i> Stocking, hat, teeth, chair, hole, barn, pig, bib, mill, blacks (applied to shoes), boat, chin, bag, cup, tongue, coat, ear, hair, eye, hand, horse, paper, rock, apple, bottle, handkerchief, string, crow, nose, door, Dinah (a calf), belt, cave, brush, dish, spoon, dog, ring, shoe, tree.
<i>Verbs.</i> Come, please, thank, kick.
<i>Adjectives.</i> More, hot, dirty.
16th Month
<i>Nouns.</i> Ida, Jessie, orange, key, mouth, pin, R (own name), stone, cart, kiss, bed, coal, pail, cover, leaf, egg, bowl.
<i>Verbs.</i> Eat, prick, cook, hold.
<i>Adjectives.</i> Big, good.
17th Month
<i>Nouns.</i> Neck, train, brow, Argus (toy dog), juice, bar, quilt, pillow, gloves, picture, dress, pocket, school, Granddaddy, light, boy, hen, sheep, moon, apron, pipe, sun, tail, porch, cheek, ther- mometer.
<i>Verbs.</i> Break, clap, pick, keep, chew, squeeze, knock, open, throw, tear, ride, hurt, blow, bow, do, caught.
<i>Adjectives.</i> Green, yellow, dear, two, cold, careful.

Adverb. Out.

18th Month

Nouns. Umbrella, spot, Sadie, pencil, A, letter, balloon, accident, Maud, time, B, paint, strap, star, sweater, rain, glass, garter, frog, fish, bunny, package, C, night, toast, napkin, couch, desk, snow, drawer, sky, Christmas, basket, petticoat.

Verbs. Bite, cut, broke, smell, dust, drop, get up, gave, lay, shut, hang, look, see, sit.

Adjectives. Clean, nice, new, a (article), other, wet.

Adverb. Yes.

Conjunction. And.

19th Month

Nouns. Drink, back-door, tray, pot, plant, necktie, nursery, study, waste-basket, cereal, broth, ribbon, knife, wreath, clothespin, automobile, clothesline, educator (a kind of cracker), Harvey, Don (a dog), Ralph, bread, turtle, pocketbook, cuff, church, knee, foot, head, cotton, library, Duke (a dog), Willie, goat, monkey, O, throat, coat-hanger, name, plate, dining-room, fire, ice, needle, pajama, poem, mother.

Verbs. Hook, pull, tie, take, lock, rock, typewrite, smoke, dance, pat, shave, lace, stick, read, tuck, put, get, cry, fall, fell, know.

Adjectives. Dry, like, this, that, these, warm, blue, red, nextdoor.

Adverbs. Not, outdoors.

Pronoun. One.

Prepositions. In, up, down, off, by, beside, for.

20th Month

Nouns. Sack, stove, wrapper, clock, kitchen, sled, lily, Winthrop, Frederick, clothes-horse, ceiling, potato, hay, frying-pan, roasting-pan, kettle, handle, house, shoulder, hay-cock, tune, down-puff, lion, camel, scissors, underclothes, fork, summer, turnip, Major (a horse), cut, children, muff, mouse, window, pain, S, T, D, E, store, dinner, tub, rubbers, purse, hoof.

Verbs. Has, stay, run, iron, suck, fix, tell, mend, play, like, hurry, climb, shake, whistle, want, hear, tumble, say, said, learn, turn, drive, let, shop, went, will, did.

Adjectives. Stuck, little, own, tight.

Adverbs. Where, about, home, too, just, away.

Pronouns. I, my.

Prepositions. On, from, to, about, out.

21st Month

Nouns. Flag, window-sill, story, Lotta, Rollo (a toy dog), Bob, papa, bench, birthday, stool, thing, banister, soap, rug, wheel, finger-nail, lip, joke, scarf, shower-bath, grass, Main Street, hinge, radiator, chamber, pie, word, cellar, bristles, vaseline, sink, skin, wheatena, money, pine tree, robin, piece, ice-box, way, F, G, H.

Verbs. Slide, wash, peek, help, guess, talk, wag, wipe, look out, wear, pour, poke, tickle, push, dig, mean, spill.

Adjectives. Gray, white, brown, deep, right, left, better, pretty, bent, empty, fat, great, funny.

Adverbs. Along, pretty soon, back, then, now, sometimes, perhaps, certainly, of course, since, until, down.

Pronouns. You, it, myself.

Prepositions. Over, around, of.

Interjection. Pshaw!

22nd Month

Nouns. Princeton (a doll), trousers, speck, stitch, nothing, envelope, strainer, mountain, coop, park, pea, hoe, rake, L, M, N.

Verbs. Ring, plant, squeak, make, brush.

Adjective. Many.

Adverb. Rather.

Pronouns. Our, his, her, your, he, she.

23rd Month

Nouns. Appetite, sofa, card, note, match, backyard, ladder, Johnnie, tassel, pansy, scrap, lap, ink, something, mop, coffee, East Orange, Mr. T-R, Mrs. T-N, butterfly, shovel, slipper, woman, colt, rope, barber, dandelion, bird, cloud, hide-and-seek, bracelet, sash, rain-drop, goat, perfume, trunk, hammock, bud, Fan (a horse), Prince (a horse), pigeon, bottom, spoonful, whole, bowl, P, Q, R.

Verbs. Waste, pound, lift, saw, need, stretch, leave, haul, touch, been, act, remember, forget, cough, belong, suppose, feed, clear up, is.

Adjectives. Busy, next, large, small, one, three, naughty, sorry, holy.

Adverbs. To-morrow, till, very, right off, back-and-forth.

Pronoun. Someone.

Preposition. Without.

24th Month

Nouns. Country, New York, pants, lots, milk-bag, fireless-cooker, fence, weather, all, wire, wistaria, cork, mosquito, dollar, coal, edge, Uncle Frank, Mr. F——n, paw, steeple, top, camera, hinge, tube, seed, butter, spinach, caterpillar, honeysuckle, present, shame, wheelbarrow, board, bouquet, people, breakfast, box, supper, U, V.

Verbs. Follow, buy, telephone, unlock, swing, float, knit, teach, had, seen, write, change, boil, shook, grow, love, cover, taste, cost, dream.

Adjectives. Silk, worn out, much, baked, bad, German, steep, fine, strong, dirty.

Adverbs. Every day, almost, quite, so, hardly, softly.

Pronouns. Who, what.

Prepositions. Before, through.

25th Month

Nouns. Shade, curtain, screw-driver, cherry, strawberry, seat, purse, right, wrong, buttercup, oats, well, farmer, brook, bee, honey, field, songsparrow, pasture, insect watch-fob, Mr. P——r, sugar, mud pie, bead, syringa, orchard, anything, woods, slop-pail, cream, end, drum, roof, splinter, bluebird, brown thrush, borax, train, engine, Fourth of July, star-spangled banner, cantaloupe, camp, shed, bump, plate, surprise, can, tree-house, scratch, back, front, jumping-rope, chipmunk, mud, elastic, number, rattle, egg-beater, J, K, L.

Verbs. Lick, string, sail, have, clean, catch, hop, strike, undo, use, think, hull, mash, chase, speak, sew, study, tip, slam, hammer, step, pack, celebrate, spank, work, buzz.

Adjectives. Four, cunning, fragile, tall, aged, slippery, aluminum, china, ugly, brass, near, pink, sore, well.

Adverbs. Already, how, once, when, upstairs.

Pronoun. Their.

Prepositions. Instead of, after.

Conjunction. But.

Interjection. Bang.

26th Month

Nouns. Mat, rice, twins, job, mattress, scar, wood, cornhusk, thunder, pole, woodshed, path, knot, skirt, trowel, speech, everybody, toe, dust, stomach, Mr. O——e, shelf, book-shelf, minute, gate, bedding, Greece, rest, vein, rascal, rapscallion, mischief, finch, magazine, pile, tank, measuring-cup, rykon (a cracker), hen-coop, middle, housework, wagon, shirt, Thetford Hill, feather, cone, fern, cannibal, bush, cake, stall, village, sister, banana, fog, braces, axe, hill, hollow, rainbow, primrose, currant, tangle, sachet, clover, daisy, goldenrod, mustard, meadow-sweet, giant, grandstand, pain, choke-cherry, river, W, X, Y, Z.

Verbs. Tuck, split, chop, creep, has broken, kneel, scrub, try, fold, wade, spin, scamper, fit, lie, gather, scold.

Adjectives. Queer, tired, cute, gold, embroidered, easy, purple, enough, faded, sour, greasy.

Adverbs. Backwards, somewhere, still, almost, ever, never.

Pronouns. Each, me we, us, him, they, them.

Preposition. Inside.

Conjunctions. Or, either, nor.

27th Month

Nouns. Sea, pool, stump, cocoa, dew, thistle, tongue, tack, pageant, tapir, Queen Ann's lace, whip-poor-will, aster, throat, Norfolk, owl, banner, self-heal, queen, eagle, maidenhair, ocean, blackberry, furniture, racket, sunlight, stamen, reflection, station, stem, buggy, jar, mountain-climber, lord, freight, bunch.

Verbs. Dip, notice, answer, weigh, order, swim, visit, save, excuse, soak, skip, believe, crow, handle, start.

Adjectives. New-fashioned, all right, comfortable, windy, hearty, tiny, mad, Greek, broad, silver, tin, iron.

Adverbs. Comfortably, indoors, crosswise.

Pronoun. Mine.

Preposition. Upon.

TABLE D

PARTS OF SPEECH BY MONTHS

	Interj.	Prep.	Conj.	Adv.	Adj.	Pro.	Nouns	Verbs	Totals
9	..	..	..	..	..	..	1	..	1
10	..	..	..	..	..	..	2	..	2
11	..	..	..	..	..	..	3	..	3
12	..	..	..	..	..	..	1	..	1
13	..	..	..	..	..	..	4	..	4
14	1	..	..	4	1	..	11	4	21
15	..	..	..	..	3	..	40	4	47
16	..	..	..	..	2	..	17	4	23
17	..	..	..	1	6	..	26	16	49
18	..	..	1	1	6	..	34	14	56
19	..	7	..	2	9	1	47	21	87
20	..	5	..	6	4	2	46	26	89
21	1	3	..	12	13	3	42	17	91
22	..	..	..	1	1	6	16	5	29
23	..	1	..	5	9	1	48	20	84
24	..	2	..	6	9	2	40	21	80
25	1	2	1	5	14	1	62	26	112
26	..	1	3	6	11	7	78	16	122
27	..	1	..	3	12	1	36	15	68
Totals	3	22	5	52	100	24	556	209	969

TABLE E

PERCENTAGES BY MONTHS

	Interj.	Prep.	Conj.	Adv.	Adj.	Pro.	Nouns	Verbs	Totals
9	..	..	..	..	..	..	100	..	100
10	..	..	..	..	..	..	100	..	100
11	..	..	..	..	..	..	100	..	100
12	..	..	..	..	..	..	100	..	100
13	..	..	..	..	..	..	100	..	100
14	5	..	..	19	5	..	52	19	100
15	..	..	..	..	6 $\frac{1}{2}$	..	85	8 $\frac{1}{2}$	100
16	..	..	..	..	9	..	74	17	100
17	..	..	..	2	12	..	53	33	100
18	..	..	2	2	10 $\frac{1}{2}$	..	60 $\frac{1}{2}$	25	100
19	..	8	..	2	10	1	54	25	100
20	..	5 $\frac{1}{2}$	..	7	4 $\frac{1}{2}$	2	52	29	100
21	1	3 $\frac{1}{3}$	..	13	14 $\frac{1}{6}$	3 $\frac{1}{3}$	46 $\frac{2}{3}$	18 $\frac{1}{2}$	100
22	..	..	..	3 $\frac{1}{2}$	3 $\frac{1}{2}$	20 $\frac{2}{3}$	55	17 $\frac{1}{3}$	100
23	..	1 $\frac{1}{4}$	..	6	10 $\frac{3}{4}$	1 $\frac{1}{4}$	57	23 $\frac{3}{4}$	100
24	..	2 $\frac{1}{2}$	..	7 $\frac{1}{2}$	11	2 $\frac{2}{3}$	50 $\frac{1}{2}$	26	100
25	1	1 $\frac{2}{3}$	1	4 $\frac{1}{3}$	12 $\frac{1}{3}$	1	55 $\frac{1}{3}$	23	100
26	..	..	2 $\frac{1}{2}$	4 $\frac{3}{4}$	8 $\frac{3}{4}$	5 $\frac{3}{4}$	64 $\frac{1}{2}$	13	100
27	..	1 $\frac{1}{2}$	..	4 $\frac{1}{2}$	17 $\frac{1}{2}$	1 $\frac{1}{2}$	53	22	100

SUMMARY

	Interj.	Prep.	Conj.	Adv.	Adj.	Pro.	Nouns	Verbs	Totals
24 mos.	2	18	1	38	63	15	380	152	657
27 mos.	3	22	5	52	100	24	556	209	969

Percentages

24 mos.	$\frac{1}{3}$	$2\frac{2}{3}$	0	$5\frac{2}{3}$	$9\frac{1}{3}$	$2\frac{1}{3}$	$56\frac{1}{3}$	$23\frac{1}{3}$	100
27 mos.	$\frac{1}{3}$	$2\frac{1}{4}$	$\frac{1}{2}$	$5\frac{1}{2}$	10	$2\frac{1}{2}$	$56\frac{2}{3}$	$22\frac{1}{4}$	100

THE ERUPTION OF THE TEETH AS A PHYSIOLOGICAL STANDARD FOR TESTING DEVELOPMENT

By ROBERT BENNETT BEAN,
The Anatomical Laboratory, the Tulane University of Louisiana

The data:	630 Filipino boys	}	776
	146 Filipino girls		
	322 German boys	}	628
	306 German girls		
	407 American boys	}	817
	410 American girls		
			2,221

MATERIALS

During the school term of 1906-07 I examined and measured every available child in the public schools of Ann Arbor. This was made possible through the coöperation of Dr. McMurrich, the superintendent of schools, and the teachers, who showed commendable zeal in furthering the work. The teeth of the children were examined by Dr. Bunting who also assisted me in making the records. Two groups of children were segregated, the one of American parentage solely, the other of German, or American and German parentage. The titles American and German will be used for the two groups. When taken together the German and American children will be called European. Children were grouped as German if two grandparents or if either parent came from Germany and whenever the name was German and the parentage was not given the child was included in the German group, although there were only a few records of this kind. There is a large colony of Germans both in the town of Ann Arbor and in the adjacent country and the majority of the Germans included in the records are of pure German extraction. A large number of children of the teaching staff at the University of Michigan are included in the American group and a large number of rural children are included in the German group. The whole lot of children may be called sub-urban.

The Manila school children were examined by myself in 1907-08 at the Normal and Trade schools, where pupils from

all parts of the Philippine Archipelago come to educate themselves as teachers and mechanics, carpenters, etc. The young children attend classes taught by the older ones at the Normal School and are necessarily from Manila and vicinity. The majority of the children are mestizos, mixed Spanish, Chinese and Filipino, and represent the littoral population of the archipelago fairly well. A few individuals are probably of pure Spanish extraction. No attempt was made to segregate the mestizos or those of Chinese or Spanish extraction from the presumably pure Filipinos because any such attempt is necessarily imperfect and will be so until we understand better than we do at present the workings of Mendelian heredity in man.

METHODS

The age of the children was obtained from each individual and verified as far as possible through the teachers. In Manila the school registers were also examined and the age verified in this way. Discrepancies occur in spite of all efforts to avoid them, but I believe nearly all the ages are exact, and the few that may not be are approximately correct. The year and month of birth were obtained in all except a few instances and the child reckoned to be a certain age if it was anywhere within six months of that age. For instance, if a child was born in January, 1902, and the records were made in July, 1908, the child was recorded as six years old, but if the records were made in July, 1907, the child was recorded as five years old, and if the records were made in August, 1908, the child was recorded as seven years old. This method is practically the same as obtaining from the child the nearest birthday, although in giving that the child is apt to miscalculate.

The youngest children whose teeth I examined were five years old, and at that age all of the temporary teeth have erupted; therefore the time of the eruption of the temporary teeth cannot be given.

THE ERUPTION OF THE PERMANENT TEETH

This is determined by taking the average or mean number of teeth erupted or erupting at each age, as well as the "median," the "mode," and the "extremes."

The eruption of the permanent teeth begins about the age of 5 years, slightly earlier among the girls and slightly later among the boys of the German and American groups, but considerably earlier than this (Tables 1-6) among the Filipinos of both sexes. The Germans and Americans of both

The Beginning of Eruption and the End of Eruption of the Permanent Teeth

Table 1. *Filipino Girls*

Teeth	Upper		Lower	
	Begin	End	Begin	End
Median Incisors.....	before 5	5 to 9	before 5	5 to 9
Lateral Incisors.....	before 5	5 to 9	before 5	5 to 9
Canines.....	5 to 9	12 to 13	before 5	5 to 9
Median Premolars.....	10 to 11	12 to 13	5 to 9	12 to 13
Lateral Premolars.....	10 to 11	12 to 13	10 to 11	12 to 13
First Molars.....	before 5	5 to 9	before 5	5 to 9
Second Molars.....	10 to 11	14 to 15	5 to 9	12 to 13
Third Molars.....	12 to 13	?	14 to 15	?

Table 2. *Filipino Boys*

Teeth	Upper		Lower	
	Begin	End	Begin	End
Median Incisors.....	before 5	5 to 9	before 5	5 to 9
Lateral Incisors.....	before 5	11	before 5	10
Canines.....	before 5	11	before 5	11
Median Premolars.....	5 to 9	14	5 to 9	14
Lateral Premolars.....	5 to 9	15	5 to 9	15
First Molars.....	before 5	10	before 5	12
Second Molars.....	5 to 9	14	5 to 9	14
Third Molars.....	13	?	13	?

Table 3. *American Girls*

Teeth	Upper		Lower	
	Begin	End	Begin	End
Median Incisors.....	6	9	5	8
Lateral Incisors.....	7	12	6	9
Canines.....	9	15	8	13
Median Premolars.....	8	13	9	14
Lateral Premolars.....	8	14	9	15
First Molars.....	6	8	5	8
Second Molars.....	10	15	10	16
Third Molars.....	16	?	16	?

Table 4. *American Boys*

Teeth	Upper		Lower	
	Begin	End	Begin	End
Median Incisors.....	7	9	6	8
Lateral Incisors.....	7	11	7	10
Canines.....	10	14	9	13
Median Premolars.....	8	16	9	14
Lateral Premolars.....	9	16	8	16
First Molars.....	6	9	6	8
Second Molars.....	12	16	11	17
Third Molars.....	?	?	?	?

Table 5. *German Girls*

Teeth	Upper		Lower	
	Begin	End	Begin	End
Median Incisors.....	7	10	5	9
Lateral Incisors.....	7	11	7	10
Canines.....	8	15	8	12
Median Premolars.....	8	13	8	14
Lateral Premolars.....	8	14	9	15
First Molars.....	5	7	5	8
Second Molars.....	11	16	10	14
Third Molars.....	?	?	14 or 16?	?

Table 6. *German Boys*

Teeth	Upper		Lower	
	Begin	End	Begin	End
Median Incisors.....	6	11	6	11
Lateral Incisors.....	7	11	7	10
Canines.....	10	14	10	14
Median Premolars.....	8	14	10	14
Lateral Premolars.....	9	14	10	14
First Molars.....	6	9	6	7
Second Molars.....	11	16	10	16
Third Molars.....	?	?	?	?

sexes have almost exactly the same number of permanent teeth at the ages of 6, 7 and 8 years, after which the girls have a greater number of teeth than the boys until the age of 15 is reached, when the number of teeth in the two sexes is again about the same. The correlation of the eruption of the teeth and of the growth in stature of the sexes is close.

The girls of each group are more precocious in the eruption of the permanent teeth than the boys; they have a greater number of permanent teeth at each age, and the difference is greatest between the ages of 8 and 15 years, for at the age of 11 years the American girls have an average of 21.3 permanent teeth present, and the American boys have an average of only 17.3. The difference between the German boys and girls at this age is not so great, and they have only 16.7 and 19.5 teeth present for the boys and girls respectively. The difference between the Filipino boys and girls is still less, and they have a greater number of teeth present than either the German or Americans at the age of 11 years, 24.3 and 27.0 for the boys and girls respectively.

The Filipinos are much more precocious than either the Germans or Americans in the eruption of the permanent teeth, and there is little difference between the boys and girls in the number of teeth present at each age. The Americans are a little more precocious than the Germans in the eruption of

the permanent teeth, and the difference between the boys and girls is greater among the Americans than among the Germans or Filipinos.

About the age of 15 years the children of both sexes in all the groups have nearly the same number of teeth, and after this age the German and American children maintain the same number of teeth up to the time at which the records cease (18 years), but the Filipino children continue to gain in the number of their teeth to the age of 20 and beyond, although the majority of the Filipinos have acquired the complete set of 32 teeth at the age of 20 years.

This is due to the early eruption of the third molars in the Filipinos, beginning at 13 years, and their later eruption in the Germans and Americans beginning at 16 years or later.

Sixty odd negro boys and girls, mostly mulattoes, were examined at Ann Arbor, and it is found that the negro boys and the American boys are almost parallel in the time of the eruption of their teeth, and the negro girls are only slightly more precocious than the American girls.

THE TIME AT WHICH APPROXIMATELY 50% OF EACH TYPE OF TOOTH IS ERUPTED

It is impossible to calculate exactly when 50% of the teeth are erupted, but approximate ages may be obtained for each type of tooth, which has been done and the results placed in Table 7.

Median Incisors. The lower median incisors erupt about the age of 6 years, and the upper at about the age of 7.5 years. This is the time of eruption in the American boys; it occurs earlier in the Filipino boys and later in the German boys, and the sexual differences are slight.

Lateral Incisors. The lower lateral incisors erupt about the age of 8 years and the upper lateral incisors erupt about the age of 8.5 years. They erupt only a little earlier in the German boys than in the German girls, but there is six months' difference in time between their eruption in the American girls and boys, the girls being earlier than the boys.

The upper lateral incisors erupt at about 8.5 years in the Filipino boys, and in the American and German girls, but at 9 years in the American boys and at 8 years in the German boys. The order of eruption of the lower lateral incisors is (1) Filipino boys, (2) American girls, (3) German girls, (4) German boys and (5) American boys.

Canines. The upper canines erupt at about 11.5 years of age, and the lower at about 10.5, except in the Filipinos where the eruption is at about 8 years for the uppers and 7 years

Table 7. *The physiological standard (see page 610) or the period of most rapid eruption of the permanent teeth, and the time at which 50% are present*

Teeth	Amer. girl	Ger. girl	Amer. boy	Ger. boy
Lower first molars	5- 6 yrs.	6- 7 yrs.	6- 7 yrs.	6- 7 yrs.
Upper first molars	5- 6 "	6- 7 "	6- 7 "	6- 7 "
Lower median incisors .	5- 6 "	6- 7 "	6- 7 "	6- 7 "
Upper median incisors .	7- 8 "	7- 8 "	7- 8 "	7- 8 "
Lower lateral incisors ..	7- 8 "	7- 8 "	7- 9 "	7- 9 "
Upper lateral incisors ..	8- 9 "	7- 9 "	8-10 "	8- 9 "
Upper median premolars	9-11 "	9-11 "	10-11 "	10-12 "
Lower canines.....	9-11 "	10-11 "	11-12 "	11-12 "
Lower median premolars	9-11 "	10-11 "	10-12 "	11-12 "
Upper lateral premolars.	10-11 "	10-11 "	10-12 "	10-12 "
Upper canines.....	10-11 "	10-12 "	11-12 "	11-12 "
Lower lateral premolars.	10-11 "	11-12 "	11-12 "	10-13 "
Lower second molars...	10-12 "	11-12 "	11-14 "	11-14 "
Upper second molars...	12-13 "	12-13 "	12-14 "	11-14 "
			Filipino boys	Filipino girls
Lower canines.....			5- 9	?
Upper canines.....			5- 9	?
Upper median premolars.....			5-10	?
Upper lateral premolars.....			7-11	?
Lower median premolars.....			10-11	?
Lower lateral premolars.....			10-11	?
Lower second molars.....			10-11	7-11
Upper second molars.....			10-11	7-13
Lower third molars.....			17-18	16.5-18.5*
Upper third molars.....			17-20	16.5-18.5*

* 50% of the Filipino girls do not have the third molars erupted until after 20 years.

for the lowers. The order of eruption of the upper canines is 1) Filipino boys, 2) Filipino girls, 3) American girls, 4) German girls, 5) American boys and 6) German boys. The notable exception to the general rule is that the Filipino boys are more precocious than the Filipino girls, although this may not be of great significance because so few Filipino girls were recorded. The order of eruption of the lower canines is 1) Filipino girls and boys, 2) American girls, 3) German girls, 4) American boys, 5) German boys. The girls' canines erupt six months earlier than the boys', and the American girls' canines erupt more than a year earlier than the American boys'.

Median Premolars. The upper median premolars erupt at about 10 years of age and the lower at about 11, except among the Filipinos where the eruption is a year earlier for the boys

and two years earlier for the girls. The order of eruption is the same for the upper and lower median premolars, 1) Filipino girls, 2) Filipino boys, 3) American girls, 4) German girls, 5) American boys, 6) German boys, which is the usual order of eruption.

Lateral Premolars. The upper lateral premolars erupt at about 11 years of age, and the lower lateral at about 11.5, except among the Filipinos, where the boys' erupt, the upper at 9, the lower at 10.5; the girls', the upper at 10 and the lower at 10.

The order of eruption is, 1) Filipino boys and girls, 2) American girls, 3) German girls, 4) American boys, 5) German boys, the upper and the lower with the same order.

First Molars. The first molars erupt near the age of six years in all the groups except the Filipino boys where the age is six for the upper but five for the lower molars. There are so few Filipino girls on record that the eruption of the upper first molars among them at 7.5 years should not be considered. There is very little difference in time between the eruption of the upper and lower teeth. The American girls are slightly precocious and the German boys slightly backward in the eruption of the first molars.

Second Molars. The upper second molars erupt at about the age of 12.5 years and the lower at about 12, except among the Filipinos where the time of eruption is 10 for the girls and 10.5 for the boys, both upper and lower. The order of eruption is the usual one in the sexes and races.

Third Molars. The time of eruption of the third molars can be given only for the Filipinos, in whom it occurs about the age of 19 years.

From Table 7 we may construct the plan of the left side of a mouth in which the teeth are arranged as they would appear were we looking into the mouth, and inside of the symbol for each tooth put the number that represents the order of its eruption.

Plan of the order of eruption of the Filipinos' teeth (girls below ten not included):

Med. Inc.	Lat. Inc.	Canines	Med. Prem.	Lat. Prem.	1 Mol.	2 Mol.	3 Mol.
3	5	4	6	7	2	8	10
1	3	3	7	8	1	8	9

Plan of the order of eruption of the Germans' and Americans' teeth:

Both sexes								
Med. Inc.	Lat. Inc.	Canines	Med. Prem.	Lat. Prem.	1 Mol.	2 Mol.	3 Mol.	
4	6	11	7	10	3	14	16	
2	5	8	9	12	1	13	15	

Resumé. The usual sex-race order of the eruption of the teeth is, 1) Filipino girls, 2) Filipino boys, 3) American girls, 4) German girls, 5) American boys, 6) German boys, as determined by the time at which approximately 50% of the teeth have erupted.

By the same standard the order of the eruption of the types of teeth for the Germans and Americans is, 1) first molars, 2) median incisors, 3) lateral incisors, 4) median premolars, 5) canines, 6) lateral premolars, 7) second molars, 8) third molars.

All the lower teeth erupt before the upper except the premolars.

The time of the eruption of the canines is of interest, especially among the Filipinos, in which the canines erupt before the eruption of the upper lateral incisors. The order of eruption of the canines in relation to that of the premolars among the Germans and Americans is, 1) upper median premolar, 2) lower canine, 3) lower median premolar, 4) upper lateral premolar, 5) upper canine, 6) lower lateral premolar.

The work of Chérot(5) is of value because it is of recent date, and because he procured data from 20 to 30 children of each sex at each age. The time of the *beginning of eruption* and of the *end of eruption* as he found them in the French may be compared with my records of the Ann Arbor children:

Table 8. *Percentage of each tooth erupted at a given age*

	Chérot—French				Bean—Ann Arbor			
Upper first molars.....	12.19%	at 5 yrs.	100%	at 8	6.25%	at 5	94.5%	at 8
Lower first molars.....	19.51	"	100	"	18.75	"	97.5	"
Upper median incisors...	0.0	"	100	at 9	0.0	"	91.6	at 9
Lower median incisors..	2.43	"	100	"	6.25	"	98.5	"
Upper lateral incisors..	0.0	at 6 yrs.	100	at 10	0.0	at 6	83.5	at 10
Lower lateral incisors..	2.27	"	100	"	1.5	"	96.5	"
Upper median premolars	2.5	at 7 yrs.	100	at 13	0.0	at 7	92.5	at 13
Lower median premolars	2.5	"	100	"	0.0	"	96.0	"
Upper lateral premolars.	2.38	at 8 yrs.	97.05	"	0.75	at 8	85.25	"
Lower lateral premolars.	4.76	"	100	"	0.325	"	83.5	"
Upper canines.....	0.0	"	97.05	"	1.0	"	80.4	"
Lower canines.....	4.76	"	100	"	2.88	"	97.1	"
Upper second molars...	8.51	at 10 yrs.	100	at 14	0.25	at 10	78.9	at 14
Lower second molars...	12.76	"	100	"	4.12	"	91.1	"
Upper third molars.....	19.5 years				1.75	at 16		
Lower third molars.....	19.5 years				3.5	"		

It is to be seen from Table 8 that the French children are earlier than the children of Ann Arbor both in the *beginning of eruption* and in the *end of eruption* of the teeth, except in the *beginning of eruption* of the lower median incisors and upper canines; wherefore it is evident that the French at any age are more mature in the eruption of the teeth than the children of Ann Arbor.

Chérot believes there are four periods of acceleration in the eruption of the permanent teeth—from six to eight and a half years, when some teeth are erupting all the time; from 10 to 11 years; at 12 years; and about 20.5 years, during the eruption of the third molars. The periods of 10 to 11 and at 12 should be combined because they run together, thus leaving three periods, which have been associated by others with the eruption of the three series of molar teeth. Welcker (16) gives the time of eruption of the permanent teeth for the Germans as follows:

First molars, 7 years.

Median incisors, 8 years.

Lateral incisors, 9 years.

Median premolars, 10 years.

Canines, 11 to 13 years.

Lateral premolars, 11 to 15 years.

Second molars, 13 to 16 years.

Third molars, 18 to 30 years.

The German are more backward than the French, which reminds us that the Germans of Ann Arbor are more backward than the Americans of the same place in the eruption of the permanent teeth.

Hrdlicka (10) has published the only detailed data of the examination of children's teeth that I have been able to find in the literature. He examined the teeth of the Apache and Pima Indians of North America, and from his records he concludes that the teeth of the Indians appear at about the same ages as the teeth of the whites, with the exception of the canines and second molars, which apparently erupt earlier in the Indians than in the whites. I have calculated the *beginning of eruption* and the *end of eruption* of the teeth in the Indians, which is based on the stature rather than the age, because the age of the Indians was not obtained by Hrdlicka. The age is calculated from the stature by Hrdlicka, and he remarks that it is doubtless imperfect.

The order of eruption is similar to that of the Europeans or white peoples, and different from that of the Filipinos, because in the latter the canines erupt before the premolars, whereas in the others the canines erupt at the time of the

Table 9. *The eruption of the teeth in the Indian*

Teeth	Male		Female	
	Begin	End	Begin	End
First molars.....	5.2	7	5.6	6
Median incisors.....	6.2	7	5.6	8.5
Lateral incisors.....	7	10	7.2	9.5
Median premolars.....	7.8	13	7.2	13
Lateral premolars.....	8.6	14.4	7.4	13
Canines.....	9	13	7.8	13
Second molars.....	9.5	13	9.3	13.8
Third molars.....	16.5	...	14	...

eruption of the premolars, or as noted above; the lower canines erupt between the eruption of the upper and lower median premolars and the upper canines erupt between the eruption of the upper and lower lateral premolars.

The eruption of the teeth begins later in the Indians than in the whites, and ends earlier. The teeth of the Indians erupt more promptly than those of the whites, and the canines, second and third molars erupt earlier in the Indians than in the whites.

Boas (4), and Boas and Wissler (3) have made reports as to the eruption of the permanent teeth in American whites but their work has been inaccessible to me and what I give is based on abstracts. Boas published the following results in *Science* recently with the remark that they "are not very accurate."

Teeth	Age in years			
	Boys		Girls	
	Boas	Bean	Boas	Bean
Inner permanent incisors.....	7.5	7.0	7.0	6.65
Outer permanent incisors.....	9.5	8.4	8.9	8.00
Bicuspid.....	9.8	11.1	9.0	10.6
Canines.....	11.2	11.6	11.3	10.5
Second molars.....	13.2	12.6	12.8	12.0

I do not know how the calculations were made by Boas but when compared with my results of the time when approximately 50% of the teeth are erupted, his records show a retarded eruption of all the teeth except the premolars, which are precocious, and erupt more than a year earlier than the premolars of the Germans and Americans of Ann Arbor. The canines in his records erupt about two years later than

the "bicuspid" (premolars?), which is very unusual. Boas and Wissler also place the end of eruption of the permanent teeth as follows: First molars, 9 years; median incisors, 12 years; bicuspid, 6-12 years; canines, 6-15 years; lateral incisors, 15 years; and second molars, 7-15 years.

MORPHOLOGIC FORM AND TEETH

In a former study of Filipino students (1 and 2) I called attention to the bad teeth of what I then called the Iberian type, but have since named the Hyper-onto-morph. This form is usually small, slender, narrow nosed, and has a long slender face with pointed chin, and a long narrow head with projecting occipital region, although at times the form may be fat, the face may be short and not slender, the nose may be stubby, and the head may be rounded; but at all times the form has characteristic ears, with everted anthelix, tragus and antitragus, and rolled back helix. The form is identical with the Mediterranean race of Sergi. In studies subsequent to those on the Filipino students, I made studies in Manila, in Taytay, a town near Manila, and in New Orleans, I have demonstrated that this form is what I call an epitheliopath, a form which is very susceptible to diseases of the structures derived from epithelium such as the lungs, alimentary canal and central nervous system. The Hyper-ontomorph is quite distinct from the round headed, round faced form with more or less infantile nose and bowl shaped ears which I call the Hypo-onto-morph. However, no observations were made of the ear form of the school children represented in this study, hence only the cephalic and facial indices, and the relative size of the occipital and parietal regions of the head can be utilized here. This will not effect a complete segregation of the Hyper-onto-morph and the Hypo-onto-morph, but it will indicate that a complete segregation such as might be accomplished by the use of the ear form and other factors would give a marked contrast between the two forms in the eruption of the teeth, in the number of good sets present, and in the average number of bad teeth. As it is, the segregation by cephalic and facial indices gives considerable difference in all three of these conditions.

The two forms are segregated by putting those with a cephalic index below 80 and a facial index below 120 in one group, and those with a cephalic index of 80 and over and a facial index of 120 and over in another, and the remainder or those with cephalic index of 80 and over and a facial index of less than 120, or with cephalic index of less than 80 and a facial index of 120 and over, in a third group. The

three will be called the Hyper-onto-morph, Hypo-onto-morph and Remainder. Below the age of 11 years the dividing figure of the cephalic index is 81 instead of 80.

Permanent teeth erupted. The Filipinos from 5-10 years of age may be neglected because of the few individuals who come under observation. The average number of teeth erupted among the German and American boys from 5-10 years of age is

Hyper- 9.87	Hypo- 9.14	Remainder 9.45
-------------	------------	----------------

The Hyper- is more precocious than the Hypo- from 5-10 years of age.

The average number of teeth erupted in all the groups from 11 to 16 years of age, including both sexes is

Hyper- 26.6	Hypo- 24.1	Remainder 25.4
-------------	------------	----------------

The Hyper- is more precocious than the Hypo- from 10-16 years of age. It is therefore evident that the Hyper, at all ages, is more precocious in the eruption of the permanent teeth than the Hypo, and this difference amounts to one or more teeth.

Number of good sets of permanent teeth present. The Filipinos below the age of 10 years may be neglected as usual. The percentage of good sets of teeth among the Germans and American boys and girls from 5 to 10 years of age is

Hyper- 80.33	Hypo- 80.98	Remainder 82.8
--------------	-------------	----------------

The percentage of good sets of teeth among the boys and girls of all the groups from 11 to 16 years is

Hyper- 18.3	Hypo- 46.8	Remainder 34.4
-------------	------------	----------------

Among the Filipinos alone from the age of 17-30, both sexes, it is

Hyper- 9.3	Hypo- 34.3	Remainder 24.2
------------	------------	----------------

It is evident that the Hyper- has fewer good sets of teeth at all ages than the Hypo.

Average number of bad permanent teeth per individual. The Filipinos below the age of 10 years may be disregarded. The average number of bad teeth below the age of 10 years among the German and American boys and girls is

Hyper- 0.468	Hypo- 0.36	Remainder 0.30
--------------	------------	----------------

The average number of decayed teeth in all the groups from 11 to 16 years of age is

Hyper- 3.35	Hypo- 1.79	Remainder 2.09
-------------	------------	----------------

The average number of decayed teeth among the Filipinos alone from 17 to 30 years of age is

Hyper- 3.33	Hypo- 2.53	Remainder 3.08
-------------	------------	----------------

It is evident from a consideration of the average number of bad permanent teeth that the Hypers have the worst teeth and the Hypos have the best.

The number of individuals in each group. Racial differences may be found by calculating the relative number of Hyper and Hypo individuals in each group. Between the ages of 5 and 16 the Filipinos have 1 Hyper to 15.2 Hypos, the Germans have 1 Hyper to 5.3 Hypos, and the Americans have 1 Hyper to 1 Hypo. From 17 to 30 years the Filipinos have 1 Hyper to 3.8 Hypos.

Sexual differences may be determined in the same manner. The Filipino girls have 1 Hyper to 28 Hypos, and the Filipino boys have 1 Hyper to 4.6 Hypos; the German girls have 1 Hyper to 7.1 Hypos, and the German boys have 1 Hyper to 4.3 Hypos; and the American girls have 1 Hyper to 1.2 Hypos, and the American boys have 1 Hyper to 0.84 Hypos.

It is also noticed that the relative number of Hypers increases with age. This is especially noticeable with the American boys for whom the ratio is 1 Hyper to 3 Hypos at 8 years of age and 12 Hypers to 1 Hypo at 16 years of age.

Hyper-morphism is a condition of development in a certain direction, a condition of greater age, a male condition, and a condition characteristic of the American (white). Hypo-morphism is a condition of development in another direction, a condition of less age, a female condition, and a condition characteristic of the Filipino.

A number of other conditions besides the shape of the head and face characterize the Hyper and the Hypo forms, such as the shape of the nose, the size of the regions of the head, the ear form, etc., the relative lengths of the extremities and of their parts, but it will suffice to give only one of these here, that is, the relative size of the occipital and parietal regions of the head.

The circumference of the forehead, frontal, parietal and occipital regions of the head of the school children were taken but they will be reserved for future studies of head form that are at present under way; only the relative size of the occipital and parietal regions of the head to each other will be given here.

The points selected from which to measure the circumference of the regions of the head are the dorsal extremities of the middle roots of the zygoma on each side of the head immediately ventral to the external ear, a place that is easily accessible and distinctly felt. The tape was passed from the point on the right side to the point on the left side around the maximum protuberance of the parietal and occipital regions of the head, and this distance recorded as the circumference of the part. An index is obtained that is called the occipitoparietal index, by multiplying the occipital circumference by

100 and dividing by the parietal circumference. This gives the occipital circumference in terms of the parietal, the latter always being 100. A high index denotes a large occipital region, a low index the reverse.

The occipito-parietal index. The occipito-parietal index in the German and American children from 5 to 10 years of age is

Hyper 80.9 Hypo 79.9

and from 11 to 16 years of age is

Hyper 82.2 Hypo 79.4

The occipito-parietal index in the Filipino boys is

5 to 10 years..... Hyper 88.4 (1) Hypo 78.3

11 to 16 years..... Hyper 81.9 Hypo 76.7

18 to 30 years..... Hyper 83.4 Hypo 79.9

The index of the Filipinos is less than that of the Germans and Americans at the same age, and the index of the Hypo in the Filipino from 17 to 30 years of age has reached that of the German and Americans at the age of 5 to 10 years, but the index of the Hyper among the Filipinos at 17 to 30 years of age has passed that of the Germans and Americans at the age of 11 to 16. The index increases with age except that the Hypos among the Germans and Americans do not change.

The Hypo has a relatively smaller occipital region in the Filipino than in the German, and a relatively larger occipital region in the American than in the German. The same is not true for the Hyper, for in them the occipital region is about the same for the American and Filipino, but relatively smaller for the German.

The sexual differences indicate that the male has a relatively larger occipital region than the female, and the female a relatively larger parietal region than the male although the difference is not great.

Magitot (13) called attention to the differences in the decay of the teeth in Normandy and Brittany, and attributed the difference to the type of people in the two compartments of France. In Brittany are the Celts or Gauls, who are small, with dark hair and eyes, and broad head, and with good teeth; in Normandy are the Belgians or Kymries, who are tall, with fair hair and eyes, and long head and with bad teeth. The color of hair and eyes seems to be incidental, because in those I examined with bad teeth and of the Hyper-onto-morph form, the color of hair and eyes was of all shades. In Southern Europe the long head has dark hair and eyes and in Northern Europe fair hair and eyes, and in Central Europe the broad head has dark hair and eyes, and in Eastern Europe

the same form has fair hair and eyes. The morphologic form is independent of pigmentation and I believe the time of eruption of the permanent teeth and the extent of their decay are due to inherent differences in the morphologic form of the individual.

THE PHYSIOLOGICAL STANDARD

The foregoing pages have been written to demonstrate that the time of the eruption of the teeth, or of any tooth, varies with sex, with race, and with morphologic form, as well as with age, and it is necessary to bear in mind all the facts in using the eruption of the teeth as a physiological standard for testing development.

I offer a protest against the use of the term physiological age, and suggest in its place the term physiological standard, because any age may be a physiological age, and all ages are physiological unless they are pathological. What is usually meant by the physiological age is, I suppose, the relative development of the individual as measured by some standard other than age. It is therefore illogical to use the term age when age is not meant.

No single factor, such as stature, or weight, or the epiphyses of the bones, or the eruption of the teeth, or the presence or absence of secondary sexual characters, or any other factor will be sufficient alone to establish the relative development of the individual, although one factor may be worth more than another in this respect, and I shall attempt to show the value of the time of eruption of the permanent teeth as a physiological standard in the determination of the relative development.

The various structural parts, or organs, of the body do not develop synchronously, but by comparing the periods of acceleration and retardation in the growth of the skeleton with the periods of acceleration and retardation in the development of the permanent teeth, taken as a whole, and by further considering individual teeth, and also the work on general development by Donaldson, Jackson, Hatai and others (6, 9, 11, 12 and 15), I have arrived at a law which may be expressed as follows:

There are one or more periods of acceleration alternating with periods of retardation in the development of any one of the structures of the body. The periods of acceleration in the development of one structure may be synchronous with the periods of retardation in the development of another structure.

Thus the period of the first six months after birth is one of rapid growth in body length, and this is followed by a period of comparative rest of the body while the eruption of the temporary teeth is taking place, all of which are through the gums by the third year. This activity in dental growth is followed by a period of rest. Following this there is a second period of rapid growth in length (stature), subsequent to which the permanent teeth begin to erupt, after which the growth of the body is again accelerated, to be followed by a second rapid eruption of the permanent teeth, and then another rapid growth of the body which is succeeded by puberty.

The lower extremities develop most rapidly from birth to 6.5 years, according to Godin (8 and 15), and they develop more rapidly than the trunk from 6.5 to 15.5 years, after which, from 15.5 to 17.5 years, the trunk develops more rapidly than the lower extremities. The great factor in the increase of stature from birth to 15.5 years is the growth in length of the lower extremities; therefore the periods of acceleration and retardation of growth refer primarily to the long bones. The development of the teeth and of the long bones are therefore reciprocal; the periods of acceleration in the development of one correspond to periods of retardation in the development of the other. In the consideration of the eruption of the permanent teeth it is necessary to bear in mind the periods of acceleration and retardation in their development, the earlier the beginning of the periods of acceleration the more precocious the child. The periods of acceleration in the development of the permanent teeth begin necessarily before the periods of most rapid eruption; the eruption of the teeth is merely the consequence of their previous rapid development.

Each tooth may be considered from the standpoint of the time at which it first appears in any individual of a group, and the time at which it last appears in any individual, as well as from the time at which 50% of the individuals have the tooth erupted, and the time during which the greatest number of individuals have the tooth erupting. Suppose we take the left upper second molar tooth in the American girls (Table 3). This tooth has not erupted in any American girl at 9 years of age, but 2% appear at 10 years, and the latest age at which any erupt is 15 years; all are erupted at 16 years. Approximately 50% have the tooth erupted at 12 years; therefore there is a shorter period for the eruption of the first 50% (10-12 years) than for the eruption of the second 50% (12-15 years). The greatest number of teeth

erupt between 11 and 12 years (41%), although there is a second period of rapid eruption between 13 and 14 years. This may be a segregation of the precocious and backward American girls.

In like manner we may obtain the same data for all the other teeth of the American girls, and of the teeth of all the other boys and girls. The upper teeth of the same type on the two sides, as the upper median incisors or the upper second molars, erupt at so nearly the same time that they may be put together. The period of most rapid eruption almost invariably coincides with the time at which 50% of the teeth have erupted; therefore the limits of the first-mentioned period will cover the second. A table may be constructed showing the results, and this table will be the physiological standard for each group of individuals in relation to the eruption of each tooth (see Table 7). The ages given are the ages at which the teeth normally appear. If the teeth appear earlier in any individual, that individual is precocious; and if later, backward. See Tables 1-6, from which the data for Table 15 are taken.

The physiological standard may be utilized to greater advantage with increasing age, because the racial and sexual differences increase with age. A word as to one way in which the table may be of use. Take a German girl of 10 years, when all the incisor teeth, the first molars, premolars and canines may be erupted; and a German boy, who may not have all these teeth erupted until 11 years of age; yet at 11 years he may be at the same physiological standard as the girl at 10 years. Should either one have all the teeth mentioned before the age specified, there would be evident precocity. In like manner evident backwardness may be determined.

The teeth are more convenient and more exact as a means of determining the physiological standard than stature, or weight, or the growth of the bones, or secondary sexual characters, etc., and they may be of greater value than any other means that can be utilized. The teeth can be seen, counted and identified by almost anyone after a little experience, and they are either present or absent, therefore very definite.

Precocity in the eruption of the permanent teeth is a sign of Hyper-morphism, and Hyper-ontomorphs are epitheliopaths, who are especially susceptible to diseases of the alimentary canal, the lungs and the central nervous system; therefore precocious children should be shielded from injuries to the susceptible organs.

Backwardness in the eruption of the permanent teeth is a sign of Hypo-morphism, and Hypo-ontomorphs, too, are probably susceptible to diseases of organs other than those mentioned, and they should be shielded from injuries to the susceptible organs.

THE SCHOOL GRADE FOR EACH YEAR OF AGE. MODE

The modal grade, or the grade that has the greatest number of individuals at each age, varies little with sex, but the Germans are about one year behind the Americans. This corresponds with the backwardness of the Germans in the eruption of the permanent teeth, and indicates considerable correlation of mental and dental development. This is true not only of the modal grade, but also of the grades above and below the mode. At each age from 7 to 14, inclusive, the children who are below the modal grade have an average of 0.9 of a tooth less than those in the modal grade, and the children who are above the modal grade have an average of 0.8 of a tooth more than those in the modal grade. The difference is greatest at 10 and 11 years, when the second period of the second dentition is at its height, and the difference at these two ages amounts to 1.5 and 1.8 teeth for those below and above the mode respectively.

It will be recalled that there is a period of one year during which the greater number of teeth of any form erupt, and during this year in nearly every case 50% of that form of tooth has erupted. From this a physiological standard, or age of eruption of each tooth, was determined. Evidence is therefore produced to indicate that the eruption of the teeth is a better criterion than age as a standard of both physical and mental development.

This evidence is not conclusive for each individual but only as an average or modal factor, because some individuals with fewer teeth than normal are above the modal grade, and some individuals with more teeth than normal are below the modal grade. Other factors therefore play a part and must not be overlooked. For instance, one child who was advanced in school grade beyond her age, and who had less than the normal number of teeth present, was the child of a teacher, and had evidently been pushed in school work.

However, the condition of the teeth, both as to eruption and decay, may be utilized and may be of value in determining the relative development of the individual.

BIBLIOGRAPHY

1. BEAN, ROBERT BENNETT. Filipino Types. I. Manila Students: An attempt to classify the littoral population of Luzon and adjacent islands. *The Philippine Journal of Science*, Vol. IV, No. 4, section A, General Science. July, 1909.
2. ———. The Racial Anatomy of the Philippine Islanders. J. B. Lippincott Co., 1910.
3. BOAS, FRANZ, and WISSLER, CLARK. Statistics of Growth. Report of U. S. Commissioner of Education for 1904, Wash., 1905.
4. BOAS, F. The Growth of Children. *Science*, N. S. Vol. XXXVII, No. 937. p. 815-818. Dec. 13, 1912.
5. CHÉROT, J. Etude statistique sur l'éruption des dents et leur âge d'apparition. 8°. Paris, 1911.
6. DONALDSON, H. H. An analysis of growth. Trans. 15th International congress on Hygiene and Demography. Wash., 1913.
7. Economy of time in education. U. S. Bureau of Education, 1913.
8. GODIN, PAUL. Recherches anthropométriques sur la croissance des diverses parties du corps. Détermination de l'adolescent type aux différents âges pubertaires d'après 36,000 mensurations sur 100 sujets suivis individuellement de 13 à 18 ans. Paris, 1903. Prix Broca.
9. HATAI, SHINKISHI. On the weights of the abdominal and the thoracic viscera, the sex glands, ductless glands, and the eyeballs of the albino rat (*Mus norvegicus albus*), according to body weight. *The American Journal of Anatomy*, Vol. 15, No. 1, July 15, 1913.
10. HRDLICKA, ALES. Physiological and medical observations among the Indians of southwestern United States and Mexico. Bureau of American Ethnology, 1908.
11. JACKSON, C. M. On the prenatal growth of the human body and the relative growth of the various organs and parts. *The American Journal of Anatomy*, Vol. IX, p. 119-166. 1909.
12. ———. Postnatal growth and variability of the body and of the various organs in the albino rat. *The American Journal of Anatomy*, Vol. 15, No. 3, July 15, 1913.
13. MAGITOT, M. Recherches ethnologiques et statistiques sur les altérations du système dentaire. *Bull. de la soc. d'anth. de Paris*, 1867. p. 71-105.
14. MAGITOT, E. Des lois de la dentition (études de physiologie comparée). *J. de l'anat. et physiol.*, etc. Paris, 1883, XIX, 59-102.
15. PFITZNER, W. Social-Anthropologische Studien, *Zeit. für Morph. u. Anth.* 1899, 1901, 1902, 1903. I. Der Einfluss des Lebensalters. II. Der Einfluss des Geschlechts. III. Der Einfluss der sozialen Schichtung (und der Konfession) auf die anthropologischen Charakter. IV. Die Proportionen des erwachsenen Menschen.
16. WELCKER, HERMANN. *Archiv. f. Anthropol.* I. 114, 1866, 89-160. *Kraniologische Mittheilungen.*

THE FIRST RUSSIAN TEACHERS' CONGRESS

A LETTER FROM RUSSIA BY MARIE LEWITIN

After many attempts the administration allowed the first Teachers' Congress to meet in Petersburg. In our country we have no right to hold meetings even on educational matters, without obtaining permission beforehand from the police and showing them the detailed program. This goes back to the Revolution of 1905. At that time the teachers were a very active element. Nearly all the elementary school teachers took part in it, as they were usually connected with the poorer classes both in town and country and thus suffered most under the reactionary Russian regime both as educators and as poorly paid workers. Their Congress and meetings in 1905 ended in very radical resolutions on political and social matters and their professional organizations also agitated and acted radically. Then came the reactionary period. From 1907-1910 all their organizations were closed, their members sent to prison or Siberia, and thousands lost their positions. There was an extirpation of all the active, intelligent elements, particularly in the country schools.

After such a revenge, such a "clearing out" of teachers, we could not hope for the First Congress to show us anything active, radical or new. Perhaps the Government had the same expectation in allowing it. But here we were deceived. In all sections of the Congress, which numbers more than seven thousand members, almost all elementary school teachers, were masses of young, hopeful teachers, both men and women, radical as to methods and all professional and organization problems. The reactionary views expressed later show this: Teachers are revolutionists. They must be "persuaded." And as a matter of fact even those teachers who spoke only on methods are now looked on as "bad elements" by school directors and inspectors and have, in some instances, been removed from the schools.

The Congress lasted twelve days of the Christmas season and as it met in five sections it is difficult to give a brief account of it and I must characterize only the more interesting events and questions discussed.

Before taking up the question of manual training in the Congress, I should explain the *status quo* in Russian schools in questions of method. Although Russia is behindhand in culture, the pedagogical publications have, for the last ten or fifteen years, begun to take up and throw light upon the important educational occurrences, theories and problems both at home and abroad. The press has become a real leader in culture, which,—in contrast to the summer courses offered to teachers—instructs them in new movements and theories. The Russian teacher, even in the distant country schools, is accustomed to think about books and reading and so he becomes acquainted with new problems, but all these "good things" are likely to remain a little theoretical, unpractised and not understood. Therefore the two sections of the Congress on methods were always crowded and the discussions were interesting from the general point of view as well as the practical.

The regular program of both our elementary and high schools for developing the child mentally and physically, is a very old one. He is, as always, taught reading and writing, in the elementary school, and a little geography and history in the high school, such as the classical and real gymnasias. This large program is usually carried out very abstractly, with much book study and little practice and work. Naturally, there are some private schools which use newer methods, and some other schools here and there in which teachers are beginning to introduce manual training, drawing and modelling. These are now in many high schools, but without any correlation with the rest of the program.

On account of the importance of manual training the discussions were detailed and the meetings popular. In the general discussion following the papers many country school teachers took part, showing a remarkable state of affairs. Side by side with teachers who, in their far-off little villages, tried new methods and gave enthusiastic accounts of their work, were others, very radical in questions of organization, but much afraid of the new schools and methods. They said, "We are poor and unorganized; we have not even fundamental rights; we live like dogs; education is not compulsory and how can we try these new methods when we do not know the detailed program and object?" Here we see the effect of the lack of freedom of the Russian people. Teachers brought up under the advice and circulars of inspectors can not free themselves from the yoke, so that even when discussing the methods of a new free school system they call for an exact program and advice. It was therefore necessary to adopt the following conciliatory resolution: "In order to realize the principle of the harmonious development of the child the Second Section deems it necessary to reform the school organization so as to base it on the best adaptation of the principle of manual work in education. This principle is to be understood as a necessary factor in the general education of every individual and all efforts to give to the elementary school a professional or industrial character must be rejected. Teachers who are introducing this principle should insist upon general culture as the inviolable basis of the elementary school."

The second part of this resolution can only be understood by a reference to a new statement in the program of elementary education by means of which the Administration, the reactionary element in the country schools and some professional school teachers tend to give an industrial character to elementary education, and to turn the schools into trade schools. Many teachers do not understand the difference between manual work as a trade and as an educational principle. The first has no place in elementary teaching while the second should be the first principle and foundation of all modern education. It was necessary therefore to make clear to the Congress as well as to all others, that the pedagogical principle is entirely different from the reactionary tendency. We should and will develop children both physically and mentally but we will not make them factory hands from their very childhood. This is the proper work of industrial or trade schools and courses, which should come as a higher step after elementary education and should be organized everywhere.

The sections also voted that programs should be adapted to local conditions and teaching made more concrete and sensory. "The need which the working class has of knowledge of how to live can be satisfied by acquainting pupils with the occurrences in nature and in human life going on about them. This adaptation of the program to the conditions of the child's life should be the outcome of coopera-

tion between the agencies of self-government (*Semstwo*) and the teachers' colleges, which should meet together at regular intervals both in town and country." All the sections came to an agreement on this but not without a struggle with the partisans of more vocational or trade training.

They were not of the same opinion however, on the question of the program. The Second Section wished to see the program enriched not by adding history, geography and natural science as separate subjects, but by teaching all together as one "science of nature." Other sections however, wished them to be distinct school subjects, and so a decision on this important problem had to be postponed to the Second Congress.

As to problems of punishment and discipline, there was a surprising condition. In a country where to-day physical punishment is used in a very severe and awful manner, the teachers do not and will not use it. The idea of free government has become very popular. Naturally, in conditions of servitude it can not be quickly realized and physical punishment is not entirely done away with in poor families, though it is in schools and free government is more and more understood in educational circles. In the Second Section there was a report on a questionnaire given to elementary school pupils, most of them children of poor parents and severely punished at home. They were asked, "Would you punish a child for this or that fault?" (seven faults being named). Most of them said they would not, or would punish him only by advice, etc. Out of twenty thousand answers only three or four said they would punish the child.

The resolution adopted was as follows: "The Second Section finds that class discipline is allowable only under such forms and conditions as will not injure the free, self-governing individuality of the pupil. The best means of preserving such discipline are good external conditions in the schools and practical internal conditions in teaching. The Second Section condemns physical and other similar punishments as degrading both to the child's individuality and to the discipline as well as the other aspects of school life and calls upon its fellow teachers to acknowledge that the use of such punishments is lowering to the teaching profession and should be rooted out of educational practice." On this question all members were of the same opinion.

In our country education has not been compulsory and there are many illiterates even in large towns. In the country children often have to go six or seven miles in wind and rain, and one teacher may have one hundred and fifty or two hundred children in two or three divisions. The organization of the schools is also heterogeneous. Those organized by the priests are quite different in method and program from those of the Administration, and these again from those of the *Semstwo* or self-governing bodies. In recent years there has been a great longing among the Russian people for learning and the *Semstvos* have organized large school systems in some localities. Even the reactionary Douma has now voted that a compulsory system of education shall be organized and introduced. Naturally, the Congress had to criticize this new program of the school department and adopt another, more radical and more corresponding to the needs, of a democratic regime:

"The state and the community should see to it that no member shall be deprived of at least an elementary education, and to realize this idea elementary education must be compulsory. Compulsory education can be introduced only if the schools are numerous, if books and other school apparatus are free, and if the external and internal conditions of the schools respond to the needs of the people. The

school period should be lengthened according to local needs but should not be less than four years."

To prevent the people's school from being merely a school for the poorer classes, the Congress wished, as the first step, to unite it with the system of higher education, and voted that children who have finished the elementary school should pass without examination to the Gymnasium or Realschule. This is a beginning in carrying out the idea of a single school system which is entirely new in our country.

The Congress also voted as the child's right, the organizing of education below the seventh year, such as kindergartens, babies' asylums, homes, etc., which should be based on the principle of free education. There should also be a larger system of education for youth by means of libraries, clubs, motion pictures, institutions for youth, etc., in each town and village, which should also be centers of culture for adults.

But all these resolutions would have no particular bearing on the sad condition of school life in Russia had not the Congress also proclaimed the need of preventing child labor, for compulsory education and the prevention of child labor sustain each other and aid in realizing the true education of the people and in conserving their mental and physical powers. They voted therefore: "(1) It should be determined upon and made law that no children under 16 should be employed in mills, factories or other places of work. (2) This law should also apply to children in trades and handicrafts, agriculture, mining, and also to children in any kind of work as well as to children in household work. (3) To carry out this law, the efficiency of factory inspection should be increased in all these places and representatives of the trade unions should be made factory inspectors." We thus see the Congress advancing from the pedagogical reasons into problems of social legislation.

I will touch upon only two other details of the program, the organization and education of teachers, and their culture influence upon rural communities.

I have already said that after 1906 the radical teachers' organizations were closed, and that those now existing have no right to discuss the serious problems of the teacher's life. The Congress voted the necessity of free organizations of a professional and educational character; that new courses should be introduced in Teachers' Academies; that courses in pedagogy should be established in Universities and that after completing the academic courses teachers should have a right to attend the Universities. The financial side of the teacher's life should also be changed. It is now intolerable, especially in the country schools. There are teachers getting 15 roubles or \$5.00 a month! A new salary scale should be introduced which would not, even in the first years, be less than 50 roubles or \$18.50 a month. Only by being better educated, better situated, and entirely free in teaching can teachers train and educate a free generation.

The country school teacher should be a leader in culture not only in matters of education but also in many other sides of country life. Each school and its teacher should be an educational center, with organized courses, lectures, excursions, choruses, etc., for adults. It is also well for teachers to belong to the local societies and to aid the fight against alcohol. The development of self-government and of social relations among the workmen and the peasants, which is now making itself apparent in the cooperative movement, should be supported by the teachers by actually taking part in this organization.

BOOK NOTES

The dramatic instinct in education. By ELNORA WHITMAN CURTIS. Boston, Houghton Mifflin, (c. 1914). 246 p.

The author of this book has taken the greatest pains with it and has several times visited Europe in the course of its preparation. The chief topics are the theatre-going of children, psychological aspects of the dramatic entertainment, dramatic work in schools and colleges, constructive efforts to provide good dramas, play, dancing, story telling, moving pictures, marionettes or puppet play, pageantry, together with a general summary. No book could be more timely and it should be in the hands of all in any way interested in the subject.

Manual of Play. By WILLIAM BYRON FORBUSH. Philadelphia, George W. Jacobs & Co., (c. 1914). 353 p.

Here we have a practical manual of plays and games. There are first directions about fitting up the play-room, home, yard, gymnasium, and then follow a discussion of the things children play and a schedule of their plays. We are told what children play at each age, plays of babies, balls, dolls, self-directed plays, laughter plays, plays that mimic life, social plays, pets, experimentation and observation, constructive games for out of doors, for girls, courtship plays, those of specific moral value, Sunday play, fifty play devices, and finally the meaning and value of play is discussed. The work contains eighteen full page illustrations.

A handbook of vocational education. By JOSEPH S. TAYLOR. New York, Macmillan, 1914. 225 p.

This work opens after an introduction with a long chapter on industrial education in the different countries of Europe, one by one, then discusses the difference between industrial and manual training. The intermediate school is next taken up, with its differentiated programs of study. Then come continuation schools, with part-time systems and then follow training of vocational teachers, the Prussian, Munich, Baden and other plans, vocational guidance, apprenticeship and compulsory education, with a concluding chapter which treats of dangers, errors, national aid, and finally topics for discussion and investigation, with a good bibliography. The appendix also contains a number of interesting articles.

Elements of general science. By OTIS WILLIAM CALDWELL and WILLIAM LEWIS EIKENBERRY. Boston, Ginn & Co., 1914. 308 p.

Science instruction in the first year of the high school has always been a very serious problem. The pupils do not have a large fund of information about common phenomena of nature. This work attempts to gather the results of many experiments made in different parts of the country for years with the purpose of organizing scientific methods of presentation which should be more educative. This work contains 33 chapters such as air, character changes, water, weather, composition of air, its relation to food, dusts, molds. Then

come several chapters on water and its uses, while the third part deals with work and energy, part four with the world's crusts, part five with the life upon earth.

The Batavia system of individual instruction. By JOHN KENNEDY. Syracuse, N. Y., C. W. Bardeen, 1914. 299 p.

The Batavia System has been one of the prominent foci of educational interests for a long time and here its author gives us a long desired and needed characterization of what it really is and also of its extent geographically and the way in which it has influenced the community and modified methods of school life. It is not merely individual instruction, nor a device for helping backward children, nor is it designed to boost pupils, nor hostile to the graded system, nor a method of getting extra work out of the teacher, nor an excuse to add to the expense of education, although all these criticisms have been made against it.

Songs of the valiant Voivode and other strange folk-lore for the first time collected from Roumanian peasants and set forth in English. By HÉLÈNE VACARESCO. New York, Charles Scribner's Sons, n. d. 238 p.

The legends of one's country should belong to each citizen by birth. The writer has wandered from village to village to gather these strange, sweet stories. They live in our blood and not one single tale here has ever been included before in books of folk-lore pupils, so they are new to the public although they have lived for centuries in the souls of the Roumanian peasants where the charms of country life and ancient customs are not hushed by their great foe, civilization. Here Dacia survives. Some of these tales are Latin, others Asiatic, some of them are prose and quite a number are translated into poetry.

Indian days of the long ago. By EDWARD S. CURTIS. Illustrated with photographs by the author and drawings by F. N. Wilson. Yonkers-on-Hudson, World Book Co., 1914. 221 p.

This book of Indian life and tales is by a master and will be welcomed by everyone interested in the subject. The illustrations are copious, indeed on nearly every page, are well chosen, and cannot fail to give those who read the book a more intimate view of Indian life in the old days and to show that they are perhaps among the most religious of races.

Stories from northern myths. By EMILIE KIP BAKER. New York, Macmillan, 1914. 276 p.

We have here in 28 chapters or sections a very telling series of stories concerning Loki, Siegfried and the Dragon, the Valkyrie, Gunther, Brunhilde, Kriemhild and the rest. There are already a number of good books in this field, and the last ought to be the best, and the writer of this note is inclined to think it is.

Foreigners' guide to English. By AZNIV BESHGETURIAN. Yonkers-on-Hudson, New York, World Book Co., 1914. 268 p.

The thought which prompted this book is a new and happy one. It is not exactly a high grade primer but it is a series of scores of lessons with a vocabulary of all the words used in them. The

material is wisely selected from practical, every-day life. This book is especially important in view of the recent suggestion made that all foreign adults below a certain age should be required to attend evening courses in English as a condition of admission to the country.

Latin America. Clark University Addresses, November, 1913. Edited by GEORGE H. BLAKESLEE. New York, G. E. Stechert & Co., 1914. 388 p.

This volume contains no less than twenty-nine addresses by eminent authorities given at Clark University during the conference on Latin America which was held in November, 1913. It was edited by the director and organizer of the conferences, Professor George H. Blakeslee.

Germany and England. By J. A. CRAMB. Introduction by the Hon. Joseph H. Choate. New York, E. P. Dutton & Co., 1914. 152 p.

This book consists of four lectures on the problem, English interference, German history and literature, the problem being whether Germany shall succeed England. Then comes the problem of peace or war, with the German views of war. Treitschke and young Germany follow, and then comes a general glance at the past and the future, especially of England, and Napoleonism in Germany.

The Oberlehrer; a study of the social and professional evolution of the German schoolmaster. By WILLIAM SETCHELL LEARNED. Cambridge, Harvard University Press, 1914. 150 p. (Harvard Studies in Education, v. 1.)

The *Oberlehrer* is selected as a model of a professionally trained teacher and the author has spent nearly two years in Prussia, Saxony and Baden to render himself competent for this work. Three long chapters are given to the history of the schoolmaster, beginning with 1500, while the last two chapters, which are the most valuable, are devoted to the *Oberlehrer* of to-day.

Abraham Lincoln's cardinal traits; a study in ethics. With an epilogue addressed to theologians. By C. S. BEARDSLEE. Boston, Richard G. Badger (c. 1914). 244 p.

We are first told of Lincoln's energy and earnestness and then of his respect for law, conscience, liberty, free will, love, life and truth, the cardinal virtues, his moral mission, how he was related to the problems of beauty, pessimism, government, mercy, meekness, reality, evil, religion, persuasion, and his personality is represented as the problem of psychology.

Mentally defective children. By ALFRED BINET and TH. SIMON. Authorized translation by W. B. Drummond. With an appendix containing the Binet-Simon tests of intelligence by Margaret Drummond, and an introduction by Alexander Darroch. New York, Longmans, Green & Co., 1914. 180 p.

It is high time to have this translation accessible in English since the Binet-Simon tests of intelligence have already had a very wide use. After the introduction, this work treats some general features of the psychology of defectives, then methods of examination and educational and social return of schools and classes for defectives.

School training of defective children. By HENRY H. GODDARD. (School Efficiency Series.) Yonkers-on-Hudson, World Book Co., 1914. 97 p.

This interesting and able work, one of the best so far published in this series, discusses existing conditions in New York, what is done for children in ungraded classes, their school-room and equipment, teachers, subdivision, suggestions from principals and teachers, importance of the problem, its solution, with final recommendations.

Symbolic teaching or Masonry and its message. By THOMAS MILTON STEWART. Cincinnati, Stewart & Kidd Co., 1914. 242 p.

This is a book on Masonry for non-Masons and we are told how it is connected with antiquity, with the higher evolution of man, the Cincinnati Masonic study school, why Rome is opposed to it, personal effort, Jacob's ladder, how to be a "high up" Mason, why guardian of liberty, our belief in another life, etc.

The demonstration play school of 1913. By CLARK W. HETHERINGTON. (University of California Publications, Education, Vol. 5, No. 2, pp. 241-288). Berkeley, University of California Press, 1914.

Dramatic readings for schools. A practice book in dramatics. By MARION FLORENCE LANSING. New York, The Macmillan Company, 1914. 242 p.

The Young and Field literary readers. By ELLA FLAGG YOUNG and WALTER TAYLOR FIELD. Books 3 and 4. Boston, Ginn & Co. 2 v.

Erziehung zur Arbeit. Von EDVARD LEHMANN. Leipzig, B. G. Teubner, 1914. 86 p.

The effect of practice upon visual apprehension in school children. By KARL M. DALLENBACH. (Reprint from Journal of Educational Psychology, June and September, 1914, p. 321-334; 389-404.)

Minor studies in learning and relearning. By DAVID SPENCE HILL. (Reprinted from Journal of Educational Psychology, September, 1914, p. 375-386.)

Efficient causes of crime. By RUFUS BERNHARD VON KLEINSMID. A lecture delivered at National Conference on Race Betterment. Battle Creek, Michigan, January 8, 1914. 12 p.

War's aftermath; a preliminary study of the eugenics of war as illustrated by the Civil War of the United States and the late wars in the Balkans. By DAVID STARR JORDAN and HARVEY ERNEST JORDAN. Boston, Houghton Mifflin Co., 1914. 104 p.

Eternal peace, and other international essays. By IMMANUEL KANT. Translated by W. Hastie, with an introduction by Edwin D. Mead. Boston, World Peace Foundation, 1914. 179 p.

Prize orations of the Intercollegiate Peace Association. Edited with an introduction by STEPHEN F. WESTON. Foreword by Charles F. Thwing. Boston, World Peace Foundation, 1914. 185 p.

Elementary Exercises in Agriculture. By S. H. DADISMAN. New York, The Macmillan Company, 1914. 106 p.

A Greek vocabulary for the use of schools. By T. NICKLIN. Cambridge, University Press, 1913. 103 p.

Erckmann-Chatrian: L'invasion, ou Le fou Yegof. Edited with notes and vocabulary, by A. WILSON-GREEN. Cambridge, University Press, 1912. 344 p.

Proceedings of the Seventh Annual Meeting of the Association of Life Insurance Presidents. New York, December 11 and 12, 1913. 202 p.

The History Teacher's Magazine. Edited under the supervision of a committee of the AMERICAN HISTORICAL ASSOCIATION. Philadelphia, McKinley Publishing Co., Vol. V, No. 7. September, 1914.

SUBJECT INDEX

Ability, Measurements of	495	Composition scale, Hillegas	559
Accounting, School	302	Courses of study in normal	
Adolescent, Characteristics of	425	schools	532
Agriculture	623	Correction	308
Alcohol	493	Crime, Efficient causes of	622
Alphabet friendships	321		
Anatomy of scholarship	290	Dancing, Text-book of	492
<i>Année Pédagogique</i>	493	Debating	159
Arithmetic	161	Defective children, Mentally	621
Art in education and life	493	— School training of	622
		Delinquents, Juvenile, Tested	
Batavia system	620	by Binet scale	523
Binet scale, Juvenile delin-		Democratic England	492
quents tested by	523	Demonstration schools record	154
Binet-Simon tests	454	Doctrine of formal discipline	336
Boarding school	157	Dramatic instinct in education	619
Bohemia, Reports from	291	—readings	622
Boy Scout movement, Psy-			
chology of	407	Economics, Home	1
Boy's vocabulary	412	Education and psychology	307
Boys and boarding school	157	—Art in	493
Bureau of Commercial Eco-		—Commercial, in Germany	308
nomics	445	—Cyclopedia of	159
		—for work	622
Chemotherapy and psycho-		—Natural	490
therapy	306	—of Karl Witte	303
Child	491	—Practical, in the elementary	
—god	309	school	488
—Study Society, South Afri-		—Pre-Meiji, in Japan	488
can	292	—Principles of	158
—welfare	302	—Purpose of	307
Child's vocabulary	95, 125	—Reform in	284
Childhood and youth, Calen-		—Vocational	619
dar of	159	—agricultural	306
Children, Examination of		Educational Psychology	154
school	158	—reorganization, State and	
—Height and weight of, in		county	490
relation to general intelli-		England, Democratic	492
gence	394	—Germany and	621
—Mentally defective	621	English for foreigners	620
—School training of defective	622	—grammar	157, 308
—Tested by Binet-Simon tests	454	—hedgerows	492
Children's literature	308, 491	—literature	301, 306
—sinistrality	485	Entrance requirements and	
Chinese womanhood	158	recent tendencies in	
Church, people and age	305	courses of study of the	
Civics and history, Oklahoma	304	normal schools of the	
Commercial education in Ger-		United States	532
many	308		

- Erckmann-Chatrian 623
 Eruption of teeth as physiological standard for testing development 596
 Ethics 308
 Eugenics 28, 488
 —of war 622
 Experimental psychology and pedagogy 306
 Expression, Verbal 578

 Falsehood 504
 Family education 493
 Feeble-mindedness 159
 Folk-Lore, Roumanian 620
 Foods and household management 156
 Foreigners' guide to English 620
 Formal discipline 336
 French verb 159

 Garden book, Beginner's 493
 German schoolmaster 621
 Germany and England 621
 Girls, For, And the mothers of girls 305
 Greek vocabulary 623
 Growing a life 303

 Hair, Scalp and 329
 Health administration, School 155
 —examination at school entrance 219
 —work in the schools 486
 Height and weight of children in relation to general intelligence 394
 High school 489
 — —age 490
 — —course of study 489
 Hillegas composition scale 559
 History Teacher's Magazine 623
 Home economics 1
 Household management 156
 Hygiene, Experimental studies in 305
 —for girls 157
 —Fourth International Congress on School 487
 —of school child 301, 488
 —School 298

 Immigration problem in Massachusetts 303
 Indian life and tales 620
 Intelligence tests 493

 Japan, Classification of universities and colleges in, as compared with the universities of the United States 264
 Japanese education 488
 Juvenile delinquents tested by Binet scale 523

 Latin America 621
 Learning and doing 490
 — —relearning 622
 Life Insurance Presidents' Association 623
 Lincoln, Abraham 621
 Literary method 156
 —readers' 622
 Literature for children 491
 —Studies in American 158

 Management, Psychology of 303
 Manual of play 619
 Marking system 158, 269
 Masonry 622
 Mathematics, Teaching of 306
 Measurements of ability to solve arithmetical problems 495
 Medical and sanitary inspection of schools 155
 Mediocrity 329
 Mental and physical life of school children 154
 —defect 306
 —development, Factors of 440
 —health of school child 487
 Mentally defective children 621
 Modern languages, Psychological aspects of teaching 256
 Montessori method 156
 Motion pictures 445
 Myths, Northern 620

 National Education Association yearbook 306
 Natural education 490
 —history of the farm 307
 Nature 306, 308
 Negroes, Study of Boston 304
 New England College Librarians 278
 New thought, Message of 303
 New York, Schools in colonial 302
 Normal schools, Entrance requirements 532

SUBJECT INDEX

627

- North wind 493
- Northern myths 620
- Oberlehrer* 621
- Oklahoma civics and history 304
- Pan American Union 159
- Panama canal 159
- Parents and their problems 302
- Peace, Eternal 622
- Peace Association, Intercollegiate 622
- Pedagogical yearbook 159
- Pedagogy, Experimental psychology and 306
- of arithmetic 161
- Physical growth and school progress 492
- Physiological standard for testing development, Eruption of teeth as 596
- Physiology, Laboratory manual for human 305
- Pillars of society 305
- Play 619
- Psychology of 469
- Play school, Demonstration 622
- Practice in visual apprehension 622
- Pre-Meiji education in Japan 488
- Primary book 494
- handiwork 493
- Psychological aspects of teaching modern languages 256
- clinics in the United States 143
- Psychologists' pictures 292
- Psychology, Education and 307
- Educational 154
- Experimental 306
- of language 157, 295
- —management 303
- —play 469
- —the Boy Scout movement 407
- Psychotherapy, Chemotherapy and 306
- Relativity 306
- Rest, How to 304
- Roumanian folk-lore 620
- Rural schools of Canada 304
- Russian Teachers' Congress, First 615
- Scalp and hair 329
- Scholarship, Anatomy of 290
- School child, Hygiene of 301, 486
- —Mental health of 487
- Children, Examination of 158
- costs and school accounting 302
- entrance, Health examination at 219
- health administration 155
- hygiene 298
- —Fourth International Congress on 487
- progress, Physical growth and 492
- training of defective children 622
- Schools in colonial New York 302
- Rural, of Canada 304
- Science, General 619
- Sex instruction 305
- Sinistrality of children 485
- Smith, Theodate Louise 160
- Solvay, Instituts 306
- South African Child Study Society 292
- Special method 308
- Spelling 159
- Experiment in teaching 287
- The child and his 490
- Stammering 293
- Symbolic teaching 622
- Teachers, Handbook of practice for 494
- Qualifications of 306
- Teaching, Tangible rewards of 494
- Teeth, Eruption of, as a physiological standard for testing development 596
- Tennyson, Through England with 492
- Testing development by teeth 596
- Times index 493
- Trans-Atlantic historical solidarity 159
- Trial balance 304
- Tuberculosis among school children 62
- Universities and colleges in Japan, Classification of 264
- University problems, Contemporary 242
- Verbal expression 578
- Visualized opportunity 445
- Vocabulary, Child's 578
- Development of a child's 95
- of a three-year-old girl 125

—of a two-and-a-half year		War's aftermath	622
old boy	412	Witte, Karl, Education of	303
Vocational agricultural edu-		Womanhood, Chinese	158
cation	306	Working girls, Young	155
—education	619		
—training	301	Young folks' handbook	158

INDEX TO AUTHORS

(The names of those who have contributed original matter are printed in SMALL CAPITALS.)

Adams, Charles Francis	159	Dallenbach, Karl M.	622
Addams, Jane	155	Daniels, John	304
Alden, Percy	492	Darroch, Alexander	621
Allen, Abel Leighton	303	Davies, Henry	493
Arnold, Felix	308	Davis, Calvin O.	489
		Dawson, Grace	304
Baker, Emilie Kip	620	DAY, LOREY C.	309, 321
Baldwin, Bird Thomas	492	Dobbs, Ella Victoria	493
Bardeen, C. W.	304	DRESSLAR, FLETCHER B.	298, 486
Barrett, John	159	Drummond, Margaret	621
BEAN, ROBERT BENNETT	284, 596	Drummond, W. B.	621
Beardslee, C. S.	621	Dugas, L.	493
Beckwith, Clarence Augustine	305		
Beshgeturian, Aznio	620	Eames, Blanche	488
Bezard, J.	156	Eikenberry, William Lewis	619
Binet, Alfred	621	ENGLEMAN, J. O.	532
Blakeslee, George H.	621	Evans, Charles	303, 304
Blount, Alma	158		
Bluemel, C. S.	293	Farrington, Frederic Ernest	308
BOGGS, A. M.	445	FEINGOLD, GUSTAVE A.	336
Boggs, Lucinda Pearl	158	Fernald, Walter E.	306
BOHN, WILLIAM E.	578	Field, Walter Taylor	622
BORING, EDWIN G.	269	Findlay, Hugh	306
BOYD, WILLIAM	95	Findlay, J. J.	154
Boykin, James C.	494	Finegan, Thomas E.	306
Bruce, H. Addington	303	Finkelstein, I. E.	158
Bunn, Clinton Orrin	304	Fisk, Eugene Lyman	159
BURNHAM, WILLIAM H.	219	FITZGERALD, CLARA P.	329
BUSH, ARTHUR DERMONT	125	Flagstad, Chr. B.	157, 295
		Forbush, William Byron	159, 619
Cajori, Florian	494	French, Allen	493
Caldwell, Otis William	619	FULTON, MARTHA J.	287
Callahan, James Morton	306		
Carus, Paul	306	Gardiner, A. G.	305
Cell��rier, L.	493	Giese, Fritz	308
Chalif, Louis H.	492	GILBERTSON, A. N.	293
Choate, Joseph H.	621	Gilbreth, L. M.	303
Cook, W. A.	490	Gilmore, George William	305
Cooley, Anna M.	156	Goddard, Henry H.	622
COPE, ELLEN	1	G��rland, Albert	308
COSULICH, GILBERT	290	Gruenberg, Sidonie Matzner	491
Cramb, J. A.	621		
Cubberley, Ellwood P.	490	HALL, G. STANLEY	242, 256
Curtis, Edward S.	620	HAMILTON, A. E.	28
Curtis, Elnora Whitman	619	Harris, William T.	157

- | | | | |
|----------------------------|----------|----------------------------|----------|
| Hartmann, Carl | 305 | Needham, James | 307 |
| Hastie, W. | 622 | Newmayer, S. W. | 155 |
| Hetherington, Clark W. | 622 | Nitze, William A. | 159 |
| Hill, David Spence | 622 | | |
| Hoag, E. B. | 486 | O'Shea, M. V. | 490 |
| Holden, Horace | 157 | | |
| Hood, Mary G. | 305 | PATRICK, G. T. W. | 469 |
| Huckel, Oliver | 492 | PINTNER, RUDOLF | 306, 523 |
| Hutchinson, J. Howard | 302 | Pitt, St. George Lane Fox | 307 |
| | | Pyle, William Henry | 158 |
| Jaederholm, G. A. | 493 | | |
| Johnson, Clifton | 492 | Rapeer, Louis W. | 155 |
| Johnston, Charles Hughes | 489 | Raymont, T. | 158 |
| JONES, GEORGE E. | 62, 298 | REANEY, M. JANE | 407 |
| Jones, W. Franklin | 159 | Renault, J. | 493 |
| Jordan, David Starr | 622 | Reynolds, Minnie J. | 308 |
| Jordan, Harvey Ernest | 622 | Richards, Florence Harvey | 157 |
| | | ROWE, E. C. | 454 |
| Kant, Immanuel | 622 | | |
| KAYFETZ, ISIDORE | 559 | Sandiford, Peter | 154 |
| Kemp, William Webb | 302 | Schulze, R. | 306 |
| Kennedy, Albert J. | 155 | Schuyten, M. C. | 159 |
| Kennedy, John | 620 | Scott, Robert | 305 |
| King, Irving | 490 | Scudder, Vida D. | 301 |
| King, Roberta | 494 | SECHRIST, FRANK K. | 295 |
| Kinne, Helen | 156 | Simon, Th. | 621 |
| von KleinSmid, Rufus Bern- | | SMITH, THEODATE L. | 143 |
| hard | 622 | SNYDER, ALICE D. | 412 |
| KUNO, EMMA E. | 425 | Stewart, Thomas Milton | 622 |
| KUNO, YOSHI S. | 264 | Stimson, R. W. | 306 |
| | | Stoner, Winifred Sackville | 490 |
| | | Swift, Edgar James | 490 |
| Lansing, Marion Florence | 622 | | |
| LATHAM, HARRIS L. | 504 | Taylor, Joseph S. | 619 |
| Learned, William Setchell | 621 | Terman, Lewis M. | 301, 486 |
| Legge, J. G. | 488 | THORNDIKE, EDWARD L. | 154, 495 |
| Lehmann, Edvard | 622 | Thwing, Charles F. | 622 |
| Lewis, Elizabeth | 493 | | |
| LEWITIN, MARIE | 615 | Vacaresco, Hélène | 620 |
| LIPPERT, EMANUEL | 291, 485 | Villiger, Emil | 159 |
| Lombard, Frank Alanson | 488 | | |
| Lowe, Orton | 491 | Wallin, J. E. Wallace | 487 |
| LYANS, C. K. | 343 | Ward, Florence Elizabeth | 156 |
| Lyon, Leverett S. | 159 | Weeks, Mary Harmon | 302 |
| | | West, Michael | 307 |
| McCracken, Thomas C. | 301 | Weston, Stephen F. | 622 |
| MCDUGLE, ERNEST C. | 161 | Williams, Edward H. | 493 |
| McMurry, Charles A. | 494 | Wilkins, Ernest H. | 159 |
| Manchester, Raymond E. | 306 | Wilson, F. N. | 620 |
| MEAD, CYRUS D. | 394 | WINCH, W. H. | 440 |
| Mead, Edwin D. | 622 | Woods, Robert A. | 155 |
| Miller, James Collins | 304 | | |
| Monroe, Paul | 159 | Young, Ella Flagg | 622 |
| Munro, Henry S. | 306 | Young, W. T. | 306 |

THE PEDAGOGICAL SEMINARY

AN INTERNATIONAL RECORD OF EDUCATIONAL LITERATURE
INSTITUTIONS AND PROGRESS

EDITED BY

G. STANLEY HALL, Ph. D., LL. D.

President of Clark University, and Professor of Psychology and Education

WITH THE ASSISTANCE OF

WILLIAM H. BURNHAM, Ph. D.

Professor of Pedagogy, Clark University

AND WITH THE CO-OPERATION OF

F. W. ATKINSON, President Polytechnic Institute of Brooklyn; T. M. BALLIST, Dean of the School of Pedagogy, New York University; Professor EARL BARNES, Philadelphia; Professor W. S. MONROE, State Normal School, Montclair, N. J.; E. H. RUSSELL, Late Principal, State Normal School, Worcester, Mass.

MARCH, 1914

	Page
HOME ECONOMICS	
BY ELLEN COPE.....	1
EUGENICS	
BY A. E. HAMILTON.....	28
TUBERCULOSIS AMONG SCHOOL CHILDREN	
BY G. E. JONES.....	62
THE DEVELOPMENT OF A CHILD'S VOCABULARY	
BY WILLIAM BOYD.....	95
THE VOCABULARY OF A THREE-YEAR-OLD GIRL	
BY ARTHUR DERMONT BUSH.....	125
THE DEVELOPMENT OF PSYCHOLOGICAL CLINICS IN THE UNITED STATES	
BY THEODATE L. SMITH.....	143
BOOK NOTES.....	154
THEODATE LOUISE SMITH.....	160

WORCESTER, MASS.

FLORENCE CHANDLER, *Publisher*

AGENTS:

London: K. PAUL, TRENCH, TRÜBNER & Co. Paris: F. ALCAN. Berlin: MAYER & MÜLLER

Copyright, 1913, by G. STANLEY HALL

Entered as second class matter at Worcester Post Office

Directory of American Psychological Periodicals

- American Journal of Psychology**—Worcester, Mass.: Florence Chandler.
Subscription \$5. 600 pages annually. Edited by G. Stanley Hall.
Quarterly. General and experimental psychology. Founded 1887.
- Pedagogical Seminary**—Worcester, Mass.: Florence Chandler.
Subscription \$5. 575 pages annually. Edited by G. Stanley Hall.
Quarterly. Pedagogy and educational psychology. Founded 1891.
- Psychological Review**—Princeton, N. J.: Psychological Review Company.
Subscription (with Psychological Bulletin) \$5. 480 pages annually.
Bi-monthly. General. Founded 1894. Edited by John B. Watson.
- Psychological Bulletin**—Princeton, N. J.: Psychological Review Company.
Subscription \$2.75. 480 pages annually. Psychological literature.
Monthly. Founded 1904. Edited by Arthur H. Pierce.
- Psychological Monographs**—Princeton, N. J.: Psychological Review Company.
Subscription \$4. 500 pages per vol. Founded 1895. Ed. by James R. Angell.
Published without fixed dates, each issue one or more researches.
- Psychological Index**—Princeton, N. J.: Psychological Review Company.
Subscription \$1. 200 pages. Founded 1895. Edited by Howard C. Warren.
An annual bibliography of psychological literature.
- Journal of Philosophy, Psychology and Scientific Methods**—New York:
Science Press. Bi-weekly. 728 pages per volume. Founded 1904.
Subscription \$3. Edited by F. J. E. Woodbridge and Wendell T. Bush.
- Archives of Psychology**—Substation 84, New York: Archives of Psychology.
Subscription \$5. 600 pp. ann. Founded 1906. Edited by R. S. Woodworth.
Published without fixed dates, each number a single experimental study.
- Journal of Abnormal Psychology**—Boston: Richard D. Badger
Subscription \$4. 480 pages annually. Edited by Morton Prince.
Bi-monthly. Founded 1906. Entire field of abnormal psychology.
- Psychological Clinic**—Philadelphia: Psychological Clinic Press.
Subscription \$1.50. 280 pages annually. Edited by Lightner Witmer.
Monthly (9 numbers). Orthogenics, psychology, hygiene. Founded 1907.
- Training School Bulletin**—Vineland, N. J.: The Training School.
Subscription \$1. 160 pages annually. Monthly (10 numbers).
Founded 1908. Edited by H. H. Goddard. Abnormal child psychology.
- Journal of Religious Psychology**—Worcester, Mass.: Louis N. Wilson.
Subscription \$3. 480 pages annually. Quarterly. Founded 1904.
Edited by G. Stanley Hall and Alexander F. Chamberlain.
- Journal of Race Development**—Worcester, Mass.: Louis N. Wilson.
Subscription \$2. 460 pages annually. Quarterly. Founded 1910.
Edited by George H. Blakeslee and G. Stanley Hall.
- Journal of Educational Psychology**—Baltimore: Warwick & York.
Subscription \$2.50. 600 pages annually. Founded 1910.
Monthly (10 numbers). Managing Editor, J. Carleton Bell.
(Educational Psychology Monographs. Edited by Guy M. Whipple.
Published separately at varying prices. Same publishers.)
- Journal of Animal Behavior**—Cambridge, Mass.: Emerson Hall.
Subscription \$3. 450 pages annually. Bi-monthly. Founded 1911.
Edited by Robert M. Yerkes.
- The Behavior Monographs**—Cambridge, Mass.: Emerson Hall.
Subscription \$3. 450 pages per volume. Edited by John B. Watson.
Published without fixed dates, each number a single research.